



DRAWINGS & RATINGS



PRODUCT DRAWINGS AND RATINGS

Section 7

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DISCLAIMER

The information in this manual is provided as a guide to assist you with your design and in writing your own specifications.

Installation conditions, including soil and structure conditions, vary widely from location to location and from point to point on a site.

Independent engineering analysis and consulting state and local building codes and authorities should be conducted prior to any installation to ascertain and verify compliance to relevant rules, regulations and requirements.

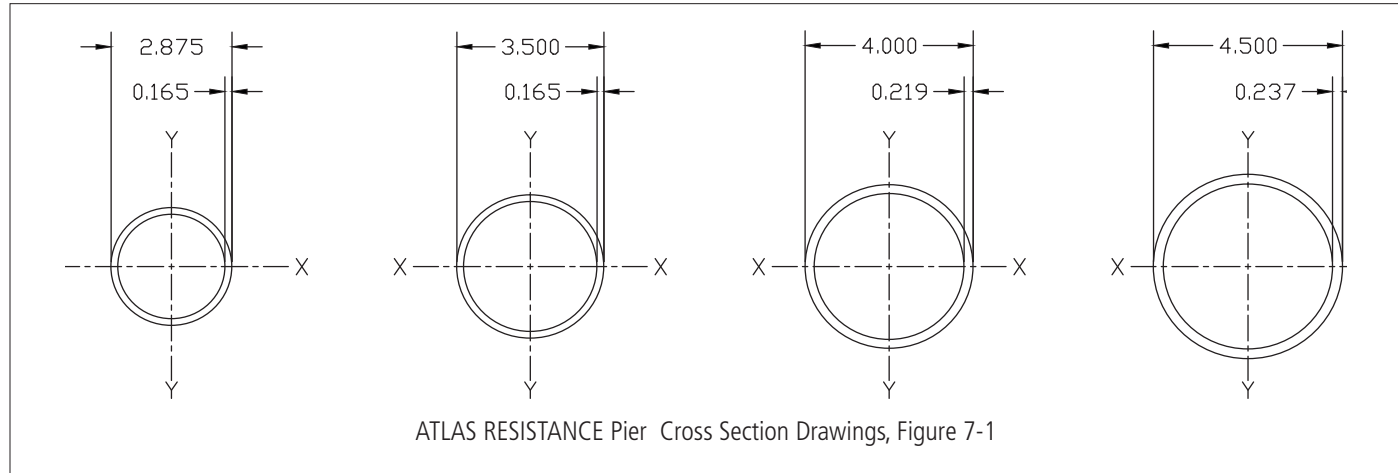
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ATLAS RESISTANCE® PIERS

The ATLAS RESISTANCE® Pier is an assembly of structural steel components that includes a steel bracket attached to the foundation or slab, which is then mounted on a steel pier that is installed to bedrock or firm bearing stratum. The lead pier starter section includes a unique friction reduction collar that reduces skin friction on the pier pipe during installation. Hubbell Power Systems, Inc. offers a broad range of pier pipe sizes and remedial repair brackets for both foundation and slab underpinning applications. This section will discuss those products in detail along with their capacity ratings.

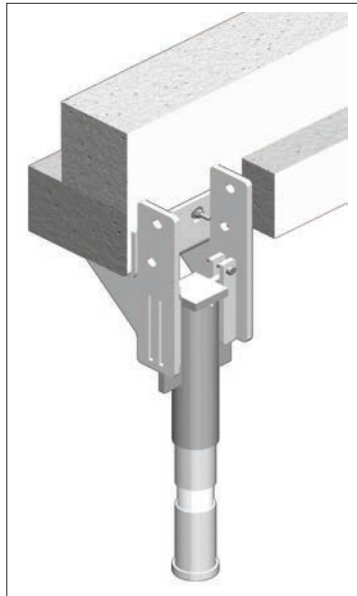
PIER PIPE SHAFTS



ATLAS RESISTANCE® Pier Section Properties, Table 7-1

PRODUCT SERIES	SHAFT SIZE in (mm)	WALL THICKNESS in (mm)	METAL AREA in ² (cm ²)	PERIMETER in (cm)	MOMENT OF INERTIA in ⁴ (cm ⁴) <i>I_{x-x}, I_{y-y}, I_{x-y}</i>	SECTION MODULUS in ³ (cm ³)	
						<i>S_{x-x} S_{y-y}</i>	<i>S_{x-y}</i>
RS2875.165	2.875 (73)	0.165 (4.2)	1.4 (9.0)	9.0 (22.9)	1.29 (53.7)	0.90 (14.7)	0.90 (14.7)
RS3500.165	3.5 (89)	0.165 (4.2)	1.7 (11.0)	11.0 (27.9)	2.41 (100.3)	1.38 (22.6)	1.38 (22.6)
RS4000.219	4.0 (101)	0.219 (5.6)	2.6 (16.8)	12.6 (32.0)	4.66 (194.0)	2.33 (38.2)	2.33 (38.2)
RS4500.237	4.5 (114)	0.237 (6.0)	3.2 (20.6)	14.1 (35.9)	7.23 (301.0)	3.21 (52.6)	3.21 (52.6)

REMEDIAL REPAIR BRACKETS for ATLAS RESISTANCE® PIERS



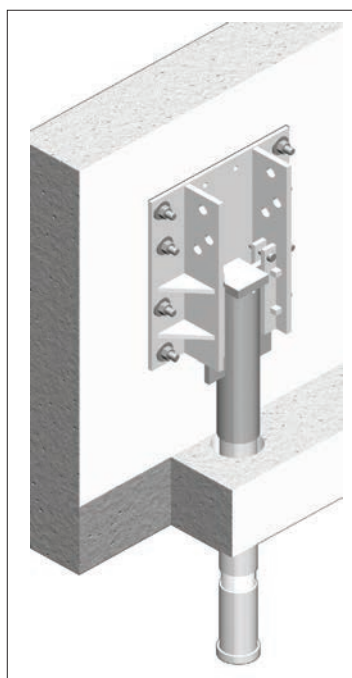
ATLAS RESISTANCE® Standard and Modified 2-Piece Systems

- Use for lifts up to 4"
- All 2-piece pier systems include:
 - Pier bracket
 - Top pier platform
 - Pier Starter with Friction Reduction Collar
 - Pier Section
 - "M" designates one modified sleeve included

Order Separately: Two pier pins (two Grade 8 bolts for 4-1/2" pier) and pier shims. Each pier requires a minimum of four anchor bolts. NOTE: Anchor bolts not supplied by Hubbell Power Systems, Inc.

See Note 3 at bottom of table for available finishes.

ATLAS RESISTANCE® STANDARD AND MODIFIED 2-PIECE PIER DESIGNATORS				
Pier Designation	Ultimate Capacity ¹	Max Working Capacity ¹	Pier Dia	Features
AP-2-UF-2875.165	60,000#	30,000#	2-7/8"	Lowest cost
AP-2-UF-2875.165M	70,000#	35,000#	2-7/8"	Lowest cost, Increased rotational stiffness, Recommended for weak surface soils
AP-2-UF-3500.165	85,000#	42,500#	3-1/2"	"Flow Coat" pier pipe standard (NER579) ²
AP-2-UFVL-3500.165	86,000#	43,000#	3-1/2"	Has additional mounting plate for two additional anchor bolts
AP-2-UF-3500.165M	91,000#	45,500#	3-1/2"	"Flow Coat" pier pipe standard (NER579) ² , Increased rotational stiffness. Recommended for weak surface soils
AP-2-UFVL-3500.165M	91,000#	45,500#	3-1/2"	Has additional mounting plate for two additional anchor bolts, Increased rotational stiffness
AP-2-UF-4000.219	98,000#	49,000#	4"	Higher capacity, Easier installation than AP2-3500M
AP-2-UFVL-4000.219	110,000#	55,000#	4"	Has additional mounting plate for two additional anchor bolts
AP-2-UF-4500.237	141,000#	70,500#	4-1/2"	Highest capacity
Notes: <ol style="list-style-type: none"> Capacities based upon maximum pipe exposure of 2 feet and soil strength having a <u>minimum</u> Standard Penetration Test (SPT) Blow Count "N" of 4. The capacities are based on a pier depth to fixity of 5'-6. Complies with the structural provisions of the most recent editions of BOCA National Code, ICBO Uniform Code, SBCCI Standard Code and 2000 International Building and Residential Code (2002 Accumulative Supplement). Available finishes: P = Entire product supplied mill finish steel. G = Entire product supplied galvanized. PA = Plain steel bracket assy; "Flow Coat" corrosion protection on pier pipe. GA = HDG bracket assy; "Flow Coat" corrosion protection on pier pipe. 				



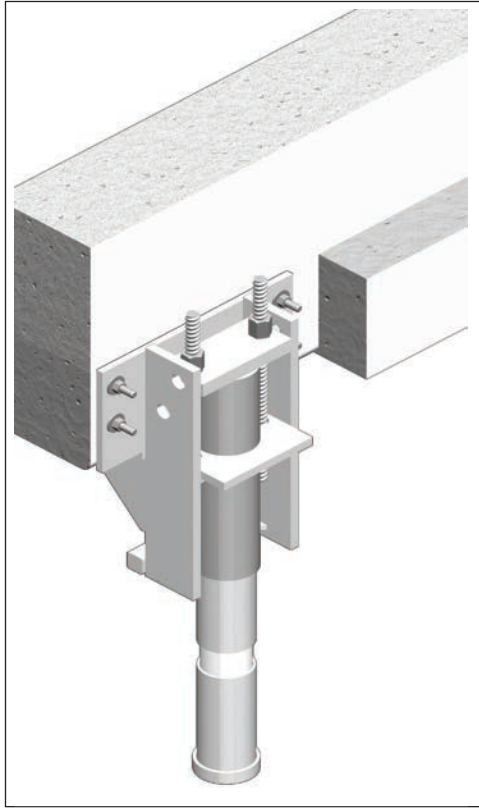
ATLAS RESISTANCE® 2-Piece Plate Pier Systems

- Easy surface mount installation.
- May be used for round columns (custom manufactured - see information below).
- Use for lifts up to 4"
- All plate pier systems include:
 - Pier bracket
 - Top pier platform
 - Pier Starter with Friction Reduction Collar
 - Pier Section

Order separately: Two pier pins (two Grade 8 bolts for 4-1/2" pier) and pier shims. Six or eight anchor bolts per pier are required (consult specification drawings on abchance.com for anchor bolt specifications). NOTE: Anchor bolts not supplied by Hubbell Power Systems, Inc.

See Note 3 at bottom of table for available finishes.

ATLAS RESISTANCE® 2-PIECE PIER PLATE PIER DESIGNATORS				
Pier Designation	Ultimate Capacity ¹	Max Working Capacity ¹	Pier Dia	Features
AP-2-PP-2875.165	60,000#	30,000#	2-7/8"	Lowest cost
AP-2-PP-2875.165M	70,000#	35,000#	2-7/8"	Lowest cost, Increased rotational stiffness, Recommended for weak surface soils
AP-2-PP-3500.165	86,000#	43,000#	3-1/2"	Standard pier for most applications, "Flow Coat" pier pipe standard
AP-2-PP-3500.165M	90,000#	45,000#	3-1/2"	"Flow Coat" pier pipe standard, Increased rotational stiffness, Recommended for weak surface soils
AP-2-PP-4000.219	103,000#	51,500#	4"	Larger pier pipe, Higher capacity
AP-2-PP-4500.237	112,000#	56,000#	4-1/2"	Commercial and Industrial applications, Greater pier pipe diameter, Highest capacity
Notes: <ol style="list-style-type: none"> Capacities based upon maximum pipe exposure of 2 feet and soil strength having a <u>minimum</u> Standard Penetration Test (SPT) Blow Count "N" of 4. The capacities are based on a pier depth to fixity of 5'-6. Mounting distance from bottom of stem wall to bottom of plate pier bracket must be greater than 5". Available Finishes: P = Entire product supplied mill finish steel. G = Entire product supplied galvanized. PA = Plain steel bracket assy; "Flow Coat" corrosion protection on pier pipe. GA = HDG bracket assy; "Flow Coat" corrosion protection on pier pipe. 				
ROUND COLUMN APPLICATIONS <p>Where a plate pier must be attached to a round column, the pier bracket can be custom manufactured at extra cost to match the radius of the column and the side rail width will be extended for clearance. Please provide diameter of column when ordering. Specify: AP-2-PPRC-2875.165, AP-2-PPRC-3500.165M or AP-2-PPRC-4000.219.</p>				



ATLAS RESISTANCE® Continuous Lift Pier Systems

- Use for lifts exceeding 4"
- Exceptional, extended lift capabilities
- All Continuous Lift Pier Systems include:
 - Continuous lift pier bracket assembly
 - Cap plate assembly
 - Top pier sleeve (Not applicable on AP-CL-UF-4000.219)
 - Pier Starter with Friction Reduction Collar
 - Pier Section

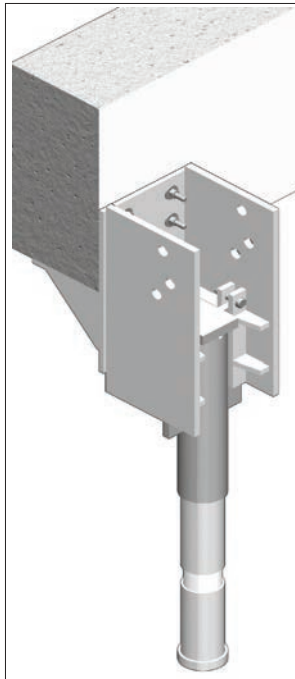
Order separately: Re-useable lift head, continuous thread rebar, nuts, and 6 anchor bolts.

See Note 2 at bottom of table for available finishes.

ATLAS RESISTANCE® Continuous Lift Pier Designators				
Pier Designation	Ultimate Capacity ¹	Max Working Capacity ¹	Pier Dia	Features
AP-CL-UF-2875.165	40,000#	20,000#	2-7/8"	Lowest cost
AP-CL-UF-3500.165	61,000#	30,500#	3-1/2"	"Flow Coat" pier pipe standard
AP-CL-UF-4000.219 (Similar to illustration)	100,000#	50,000#	4"	Higher capacity

Notes:

- Capacities based upon maximum pipe exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count "N" of 4. The capacities are based on a pier depth to fixity of 5'-6.
- Available Finishes: P = Entire product supplied mill finish steel. G = Entire product supplied galvanized. PA = Plain steel bracket assy; "Flow Coat" corrosion protection on pier pipe. GA = HDG bracket assy; "Flow Coat" corrosion protection on pier pipe.



ATLAS RESISTANCE® 2-Piece Predrilled Pier Systems

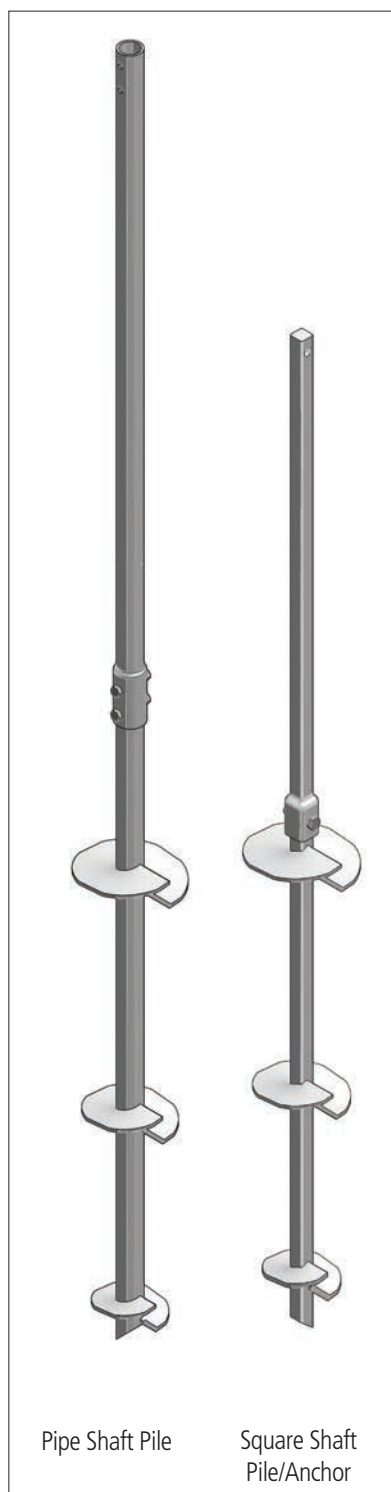
- Use for lifts up to 4"
- Drilled pier access hole required where unsuitable rock is near surface
- Use where designer requires penetration into bearing rock
- Eccentricity from wall to C-L pipe is 6-3/4"
 - All pre-drilled piers include:
 - Pier bracket
 - Top pier platform
 - Pier Starter with Friction Reduction Collar
 - Pier Section

Order separately: Two pier pins and four anchor bolts per pier, and shims as required.

See Note 2 at bottom of table for available finishes.

ATLAS RESISTANCE® 2-Piece Predrilled Pier Designators				
Pier Designation	Ultimate Capacity ¹	Max Working Capacity ¹	Pier Dia	Features
AP-2-UFPDVL-2875.165M	58,000#	29,000#	2-7/8"	Lowest cost
AP-2-UFPDVL-3500.165M	62,000#	31,000#	3-1/2"	Low cost, Corrosion resistant, "Flow Coat" pier pipe standard
AP-2-UFPDVL-4000.219	76,000#	38,000#	4"	Higher capacity
AP-2-UFPD-4500.237	92,000#	46,000#	4-1/2"	Highest capacity, Commercial and Industrial applications
Notes:				
1. Capacities based upon maximum pipe exposure of 2 feet and soil strength having a <u>minimum</u> Standard Penetration Blow Count (SPT) of 4. The capacities are based on a pier depth to fixity of 5'-6.				
2. Available Finishes: P = Entire product supplied mill finish steel. G = Entire product supplied galvanized. PA = Plain steel bracket assy; "Flow Coat" corrosion protection on pier pipe. GA = HDG bracket assy; "Flow Coat" corrosion protection on pier pipe.				

ATLAS RESISTANCE® 2-Piece Predrilled Plate Pier Designators (Special Order-Not Shown)				
Note: Mounting distance from bottom of stem wall to bottom of plate pier bracket must be greater than 5".				
AP-2-PPPD-3500.165	76,000#	38,000#	3-1/2"	Lowest cost, Corrosion resistant, "Flow Coat" pier pipe standard
AP-2-PPPD-3500.165M	80,000#	40,000#	3-1/2"	Low cost, Corrosion resistant, "Flow Coat" pier pipe standard
AP-2-PPPD-4000.219	83,000#	41,500#	4"	Higher capacity
AP-2-PPPD-4500.237	95,000#	47,500#	4-1/2"	Highest capacity, Commercial and Industrial applications



CHANCE® HELICAL PILES/ANCHORS

Introduction

A helical pile/anchor is a factory-manufactured steel deep foundation system designed to resist axial compression, axial tension, and/or lateral loads from structures. It consists of a central steel shaft with one or more helical-shaped bearing plates welded to the central steel shaft. The central steel shaft can be one-piece (non-extendable) or fully extendable with one or more extension shafts, couplings, and a bracket/termination that allows for connection to building structures. A helical pile/anchor is screwed into the ground by application of torsion and can be extended until a required depth or a suitable bearing soil stratum is reached. Load is transferred to the soil through the helix bearing plates. Central steel shafts are available in either Type SS (Square Shaft) series or Type RS (Round Shaft) series. The Type SS series are available in 1-1/4" to 2-1/4" square sizes. The Type RS series are available in 2-7/8" to 8" diameter sizes. Type SS/RS Combo Piles are available for compression applications in soil conditions where dense/hard soils must be penetrated with softer/loose soils above the bearing strata. The grouted shaft CHANCE HELICAL PULLDOWN® Micropile series is also used in applications similar to those requiring the use of the Type SS/RS Combo Piles, but have the additional benefit of generating capacity via skin friction along the grout-soil interface in a suitable bond zone stratum. For a complete list of mechanical ratings and section properties of the central steel shafts, see the Tables found in each helical pile/anchor Product Family in this Section. Refer to Section 3, Product Feasibility and Section 6, Installation Methodology for guidelines on the proper shaft selection based on application, soil conditions, site accessibility, etc.

Helical pile/anchor sections are joined with bolted couplings. Installation depth is limited only by soil density and practicality based on economics. A helical bearing plate or "helix" is one pitch of a screw thread. Most helical piles include more than one helix plate, and the plates are arranged in a "tapered" configuration with the smallest helix being in the bottom and the largest helix being on the top. The large majority of CHANCE® helix plates, regardless of their diameter, have a standard 3" pitch. Being a true helical shape, the helix plates do not auger into the soil but rather screw into it with minimal soil disturbance. CHANCE helix plates are "pre-qualified" per the requirements of Table 3 in ICC-ES AC308 Acceptance Criteria for Helical Pile Systems and Devices, meaning they are generally circular in plan, have a true helix shape, and are attached perpendicular to the central steel shaft with the leading and trailing edges parallel. Helix plates are spaced at distances far enough apart that they function independently as individual bearing elements; consequently, the capacity of a particular helix on a helical pile/anchor shaft is not influenced by the helix above or below it.

Lead Section and Extensions

The starter section or “lead” section contains the helix plates. This lead section can consist of a single helix or up to four helices. Additional helix plates can be added, if required, with the use of helical extensions. Standard helix sizes and areas are shown in Table 7-2 and 7-3 below. Tables 7-2 and 7-3 provide the projected areas of the most common helix plate diameters. Table 7-2 provides helix areas for Type Square Shaft Helical Piles, and Table 7-3 provides helix areas for Type Round Shaft Helical Piles. The full plate projected area includes the area occupied by the central steel shaft. The “area less shaft” is the projected area of the helix plates less the area occupied by the center shaft. Most all CHANCE® helix plates are provided with a sharp leading edge, which is the front edge of the helix that penetrates the soils as the helical anchor/pile is advanced clockwise through soil. The sharp leading edge enables the helix to better slice through tough soils, roots, and seasonally frozen ground. Hubbell Power Systems, Inc. offers several helix plates with “sea shell” leading edges as special options to the product series. Our standard “sea shell” configuration that works best in most tough soils conditions is the 90° design as shown below. The sea shell cut is a leading edge with a “spiral” cut that is very effective when installing helical piles/anchors in debris laden soils, cobbles, and weathered rock.

However, it is important to remember that the bearing capacity of the helical pile/anchor is reduced because the bearing surface area is reduced. Therefore, larger helix diameters or additional helix plates may be required when using “sea shell” cut plates. Tables 7-2 and 7-3 include the projected areas of helix plates offered with the sea shell cut. The helix plates are arranged on the shaft such that their diameters increase as they get farther from the pilot point. The practical limits on the number of helices per pile/anchor is four to five if placed in a cohesive soil and six if placed in a cohesionless or granular soil.

Plain extensions are then added in standard lengths of 3, 5, 7 and 10 feet until the lead section penetrates into the bearing strata. Standard helix configurations are provided in the product series tables in this section. Note that lead time will be significantly reduced if a standard helix configuration is selected.

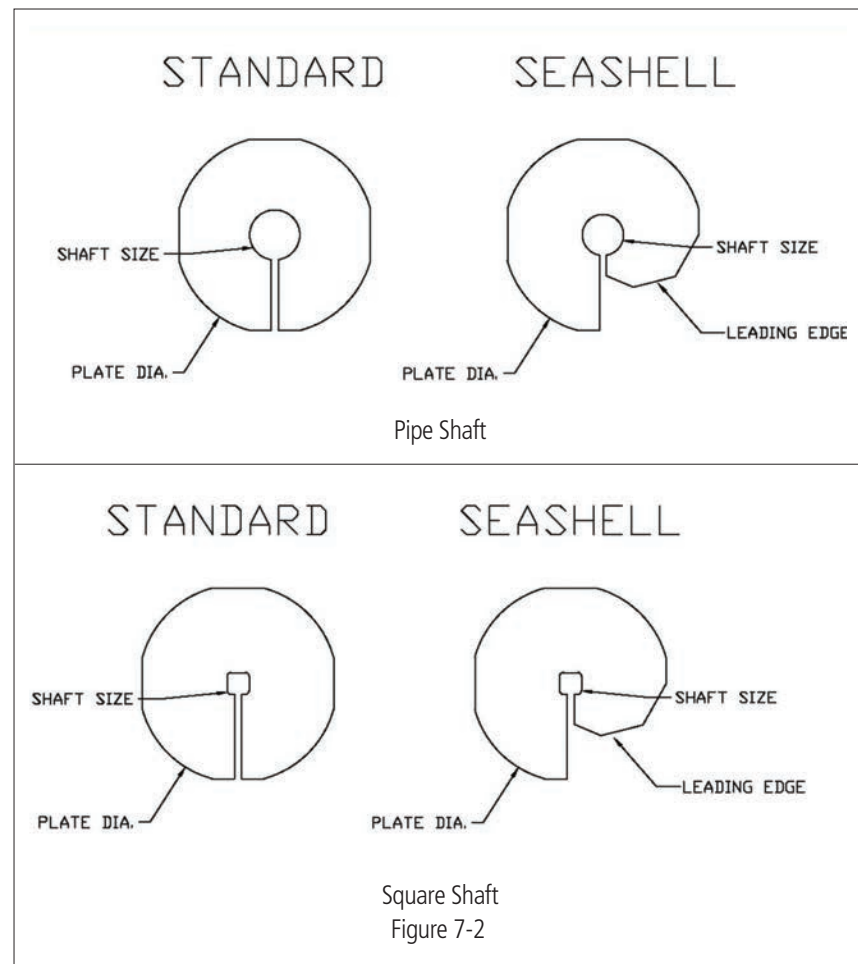


Table 7-2: CHANCE® Square Shaft Helix Plate Sizes and Projected Areas by Product Family

	Diameter in. (mm)	SQUARE SHAFTS			
		STANDARD		SEASHELL	
		AREA w/o HOLE ft ² (m ²)	FULL PLATE AREA ft ² (m ²)	AREA w/o HOLE ft ² (m ²)	FULL PLATE AREA ft ² (m ²)
SS125	6 (150)	0.174 (0.0162)	0.185 (0.0172)	N/A	N/A
	8 (200)	0.324 (0.0301)	0.336 (0.0312)	0.304 (0.0282)	0.316 (0.0294)
	10 (250)	0.519 (0.0482)	0.531 (0.0493)	0.468 (0.0435)	0.479 (0.0445)
	12 (300)	0.759 (0.0705)	0.771 (0.0716)	0.668 (0.0621)	0.679 (0.0631)
	14 (350)	1.037 (0.0963)	1.049 (0.0975)	0.903 (0.0839)	0.915 (0.0850)
	16 (406)	1.366 (0.1269)	1.378 (0.128)	N/A	N/A
SS5/ SS150	6 (150)	0.169 (0.0157)	0.185 (0.0172)	0.156 (0.0145)	0.172 (0.0160)
	8 (200)	0.320 (0.0297)	0.336 (0.0312)	0.300 (0.0279)	0.316 (0.0294)
	10 (250)	0.515 (0.048)	0.531 (0.0493)	0.463 (0.0430)	0.479 (0.0445)
	12 (300)	0.755 (0.0701)	0.771 (0.0716)	0.663 (0.0616)	0.679 (0.0631)
	14 (350)	1.033 (0.0960)	1.049 (0.0975)	0.899 (0.0835)	0.915 (0.0850)
	16 (406)	1.362 (0.1265)	1.378 (0.128)	N/A	N/A
SS175	6 (150)	0.163 (0.151)	0.185 (0.0172)	N/A	N/A
	8 (200)	0.314 (0.0292)	0.336 (0.0312)	0.293 (0.0272)	0.316 (0.0294)
	10 (250)	0.509 (0.0473)	0.531 (0.0493)	0.457 (0.0425)	0.479 (0.0445)
	12 (300)	0.749 (0.0696)	0.771 (0.0716)	0.658 (0.0611)	0.679 (0.0631)
	14 (350)	1.027 (0.0954)	1.049 (0.0975)	N/A	N/A
	16 (406)	1.356 (0.126)	1.378 (0.128)	N/A	N/A
SS200	6 (150)	0.154 (0.0143)	0.185 (0.0172)	0.143 (0.0133)	0.172 (0.0160)
	8 (200)	0.305 (0.0283)	0.336 (0.0312)	N/A	N/A
	10 (250)	0.500 (0.0465)	0.531 (0.0493)	0.450 (0.0418)	0.479 (0.0445)
	12 (300)	0.740 (0.0687)	0.771 (0.0716)	N/A	N/A
	14 (350)	1.018 (0.0946)	1.049 (0.0975)	N/A	N/A
	16 (406)	1.349 (0.1253)	1.378 (0.128)	N/A	N/A
SS225	6 (150)	0.149 (0.0138)	0.185 (0.0172)	N/A	N/A
	8 (200)	0.300 (0.0279)	0.336 (0.0312)	N/A	N/A
	10 (250)	0.495 (0.0460)	0.531 (0.0493)	N/A	N/A
	12 (300)	0.735 (0.0683)	0.771 (0.0716)	N/A	N/A
	14 (350)	1.013 (0.0941)	1.049 (.0975)	N/A	N/A
	16 (406)	1.341 (0.125)	1.378 (0.128)	N/A	N/A

Table 7-3: CHANCE® Pipe Shaft Helix Plate Sizes and Projected Areas by Product Family

		PIPE SHAFTS			
		STANDARD		SEASHELL	
	Diameter in. (mm)	AREA w/o HOLE ft ² (m ²)	FULL PLATE AREA ft ² (m ²)	AREA w/o HOLE ft ² (m ²)	FULL PLATE AREA ft ² (m ²)
RS2875	8 (200)	0.290 (0.0269)	0.336 (0.0312)	0.270 (0.0251)	0.316 (0.0294)
	10 (250)	0.485 (0.0451)	0.531 (0.0493)	0.433 (0.0402)	0.479 (0.0445)
	12 (300)	0.725 (0.0674)	0.771 (0.0716)	0.633 (0.0588)	0.680 (0.0632)
	14 (350)	1.003 (0.0932)	1.049 (0.0975)	0.869 (0.0807)	0.915 (0.0850)
	16 (406)	1.31 (0.122)	1.378 (0.128)	N/A	N/A
RS3500	8 (200)	0.268 (0.0249)	0.336 (0.0312)	N/A	N/A
	10 (250)	0.463 (0.0430)	0.531 (0.0493)	N/A	N/A
	12 (300)	0.703 (0.0653)	0.771 (0.0716)	0.612 (0.0569)	0.680 (0.0632)
	14 (350)	0.981 (0.0911)	1.049 (0.0975)	N/A	N/A
	16 (406)	1.312 (0.122)	1.378 (0.128)	N/A	N/A
RS4500	8 (200)	0.224 (0.0208)	0.336 (0.0312)	N/A	N/A
	10 (250)	0.419 (0.0389)	0.531 (0.0493)	0.367 (0.0341)	0.479 (0.0445)
	12 (300)	0.659 (0.0612)	0.771 (0.0716)	N/A	N/A
	14 (350)	0.937 (0.0871)	1.049 (0.0975)	N/A	N/A
	16 (406)	1.266 (0.1176)	1.378 (0.128)	N/A	N/A
	20 (508)	2.034 (0.1889)	2.146 (0.1994)	N/A	N/A

Table 7-4 is a quick reference guide for the design professional. It relates ASTM D1586 SPT “N₆₀” values for cohesive and non-cohesive soils to the expected load capacity of various CHANCE Type Square Shaft (SS) and Round Shaft (RS) Helical Piles. It is intended to be used as a reference guide to enable the designer to quickly determine which helical pile systems to use for project specific soil conditions and load requirements.

Table 7-4: CHANCE® Helical Pile/Anchor Load Capacity Table

Soil Type		Product Family		Axial Compression / Tension Capacity*	
“N ₆₀ ”- Value** Cohesive	“N ₆₀ ”-Value** Non-Cohesive	Helical Pile Shaft Size Inches (mm)	Torque Rating Ft-lb (N-m)	Ultimate Capacity [P _u] Kip (kN)	Allowable Capacity [P _a = 0.5 P _u] Kip (kN)
25 – 35	25 - 30	SS5 1-1/2 (38)	5,700 (7,730)	57 (254)	28.5 (127)
25 - 40	25 - 35	SS150 1-1/2 (38)	7,000 (9,500)	70 (312)	35 (156)
35 - 50	35 -40	SS175 1-3/4 (44)	10,500 (14,200)	105 (467)	52.5 (234)
50 - 70	40 - 60	SS200 2 (51)	16,000 (21,700)	160 (712)	80 (356)
70 - 90	60 - 80	SS225 2-1/4 (57)	21,000 (28,475)	210 (934)	105 (467)
20 - 25	15 - 20	RS2875.203 2-7/8 (73)	5,500 (7,500)	49.5 (220)	24.75 (110)
25 - 35	20 - 30	RS2875.276 2-7/8 (73)	8,000 (10,850)	72 (320)	36 (160)
35 - 40	30 – 35	RS3500.300 3-1/2 (89)	13,000 (17,600)	91 (405)	45.5 (202)
35 – 40	30 – 35	RS4500.337 4-1/2 (114)	23,000 (31,200)	138 (614)	69 (307)

* Based on Torque Rating – Axial Compression / Tension Capacity = Torque Rating x K_t. Well documented correlations with installation torque are recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. “Default” K_t for Type SS = 10 ft⁻¹ (33 m⁻¹). “Default” K_t for Type RS2875 Series = 9 ft⁻¹ (30 m⁻¹); for Type RS3500.300 = 7 ft⁻¹ (23 m⁻¹); for Type RS4500.337 = 6 ft⁻¹ (20 m⁻¹).

** “N₆₀” Values or Blow Count from the Standard Penetration Test per ASTM D1586.

NOTES:

- The table above is given as a guideline only. The capacity of CHANCE Helical Pile/Anchors may vary depending on, but not limited to, water table elevation and changes to that elevation, changes in soil conditions and soil layer thicknesses.
- Achievable capacities could be higher or lower than stated in the table depending on:
 - Site specific conditions
 - On-site testing verification
 - HELICAL PULLDOWN® Micropiles can achieve higher capacities in compression. On-site testing should be performed to verify additional pile capacity.
 - This chart is to be used for preliminary design assessment only. Capacities should be verified on per project, site-specific basis by a registered design professional.
- The above chart represents the hardest or densest soil conditions that the helical pile can be installed into. The helical pile will likely achieve its torque rating quickly upon encountering the highest N values indicated above.

CHANCE® Type SS125 Helical Piles and Anchors

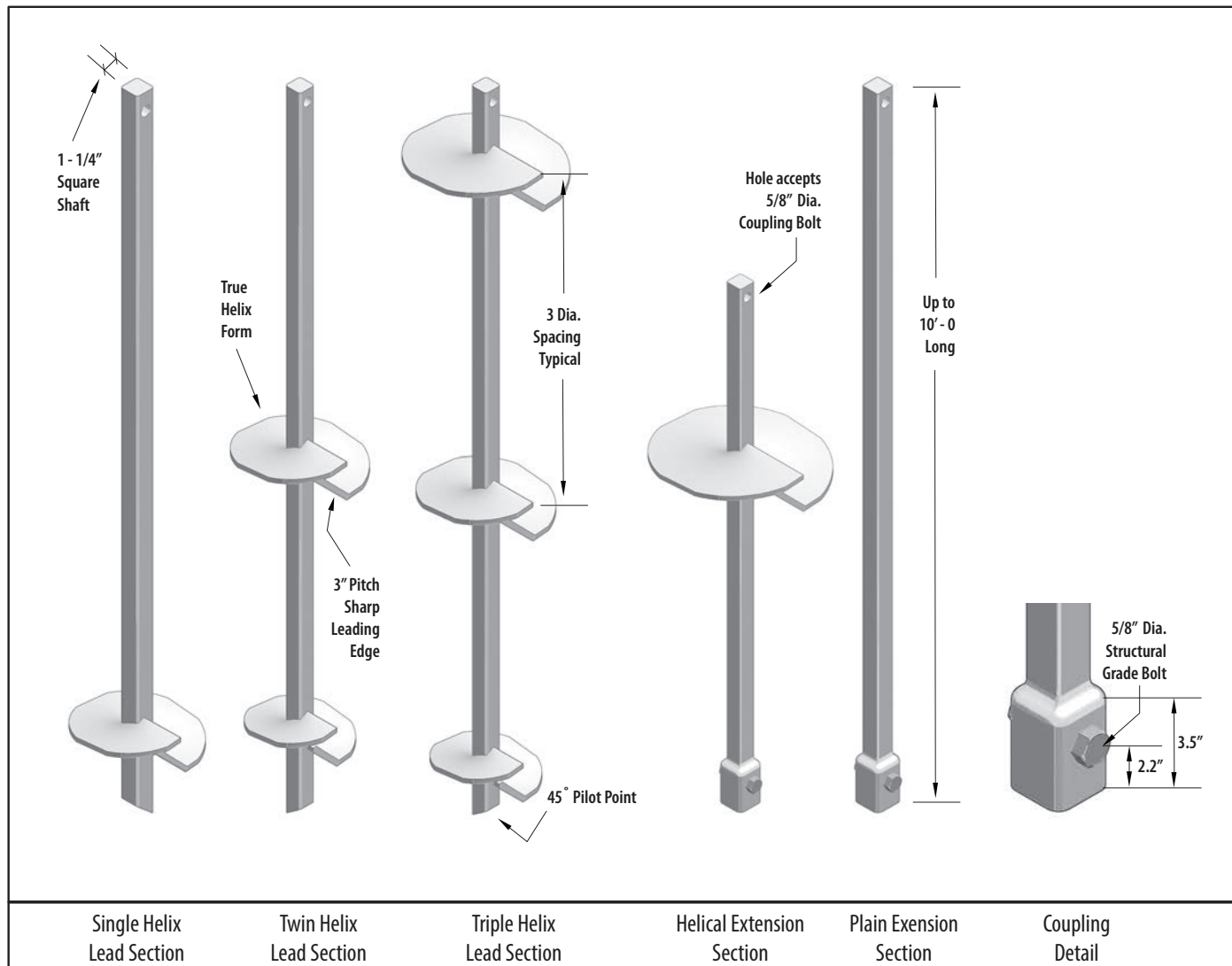
40 kip Ultimate – 20 kip Allowable Capacity

Installation Torque Rating – 4,000 ft-lb

Multi-Purpose 1-1/4 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS125 Helical Piles and Anchors have 40 kip ultimate capacity and 20 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS125 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 1-1/4 inch solid steel shaft produced exclusively for CHANCE products.

Coupling - forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix - 3/8 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 50 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, or 14 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

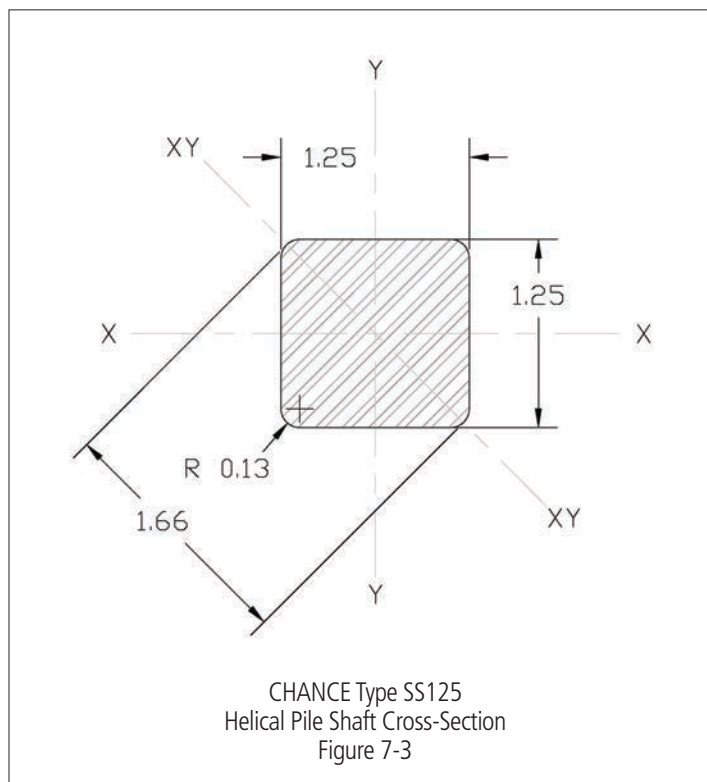
The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

- Single, double, and triple Lead Sections, 1 and 5 feet long
- Plain Extensions, 3, 5, 7, and 10 feet long
- Extensions with Helix Plates, 3-1/2 feet long, single and double helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of SS125 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
6 (150)	0.375 (9.5)	37.4 (166.3)	33.7 (149.9)	18.7 (83.2)
8 (200)	0.375 (9.5)	37.4 (166.3)	33.7 (149.9)	18.7 (83.2)
10 (250)	0.375 (9.5)	46.6 (207.3)	41.9 (186.4)	23.3 (103.6)
12 (300)	0.375 (9.5)	44.1 (196.2)	39.7 (176.6)	22.1 (98.3)
14 (350)	0.375 (9.5)	36.0 (160.1)	32.4 (144.1)	18.0 (80.1)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS125 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		27.3 (121.4)	24.6 (109.4)	13.4 (59.6)	12.0 (53.4)	6.8 (30.2)	6.2 (27.6)
Lead, Multi-Helix	53.6 (238.4)	48.2 (214.4)	27.3 (121.4)	24.6 (109.4)	13.4 (59.6)	12.0 (53.4)	6.8 (30.2)	6.2 (27.6)
Extension	53.6 (238.4)	48.2 (214.4)	27.3 (121.4)	24.6 (109.4)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS125 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1530 with 90 ksi minimum yield strength			
Shaft Size	1.25 in	32 mm	Corroded	
			1.237 in	31.4 mm
Moment of Inertia (I)	0.20 in ⁴	8.3 cm ⁴	Corroded	
			0.191 in ⁴	7.95 cm ⁴
Shaft Area (A)	1.55 in ²	10.0 cm ²	Corroded	
			1.52 in ²	9.81 cm ²
Section Modulus (S _{x-x})	0.32 in ³	5.3 cm ³	Corroded	
			0.31 in ³	5.1 cm ³
Perimeter	4.79 in	12.17 cm	Corroded	
			4.74 in	12.0 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One 5/8 inch Diameter ASTM A325 Type 1 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.375 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 50 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	4,000 ft-lb		5,400 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	50 kip	222 kN	37.5 kip	167 kN
Allowable Tension Strength	25 kip		111 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	40 kip	178 kN	20 kip	89 kN

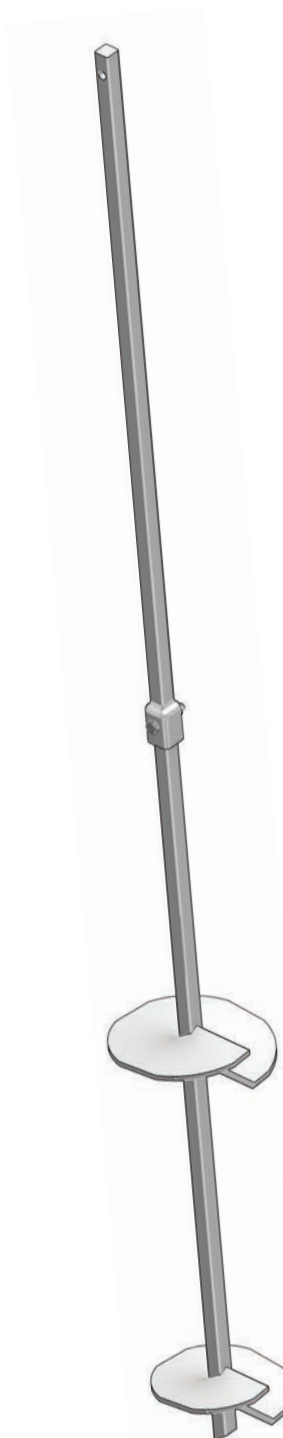
ASD Allowable Compression Strengths of CHANCE® Type SS125 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table	16.4 (72.9)	8.0 (35.6)	4.1 (18.2)
Lead, Multi-Helix	32.1 (142.8)	16.4 (72.9)	8.0 (35.6)	4.1 (18.2)
Extension	32.1 (142.8)	16.4 (72.9)	8.0 (35.6)	4.1 (18.2)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.



Assembly of SS125
Figure 7-4

CHANCE® Type SS5 Helical Piles and Anchors

57 kip Ultimate – 28.5 kip Allowable Capacity

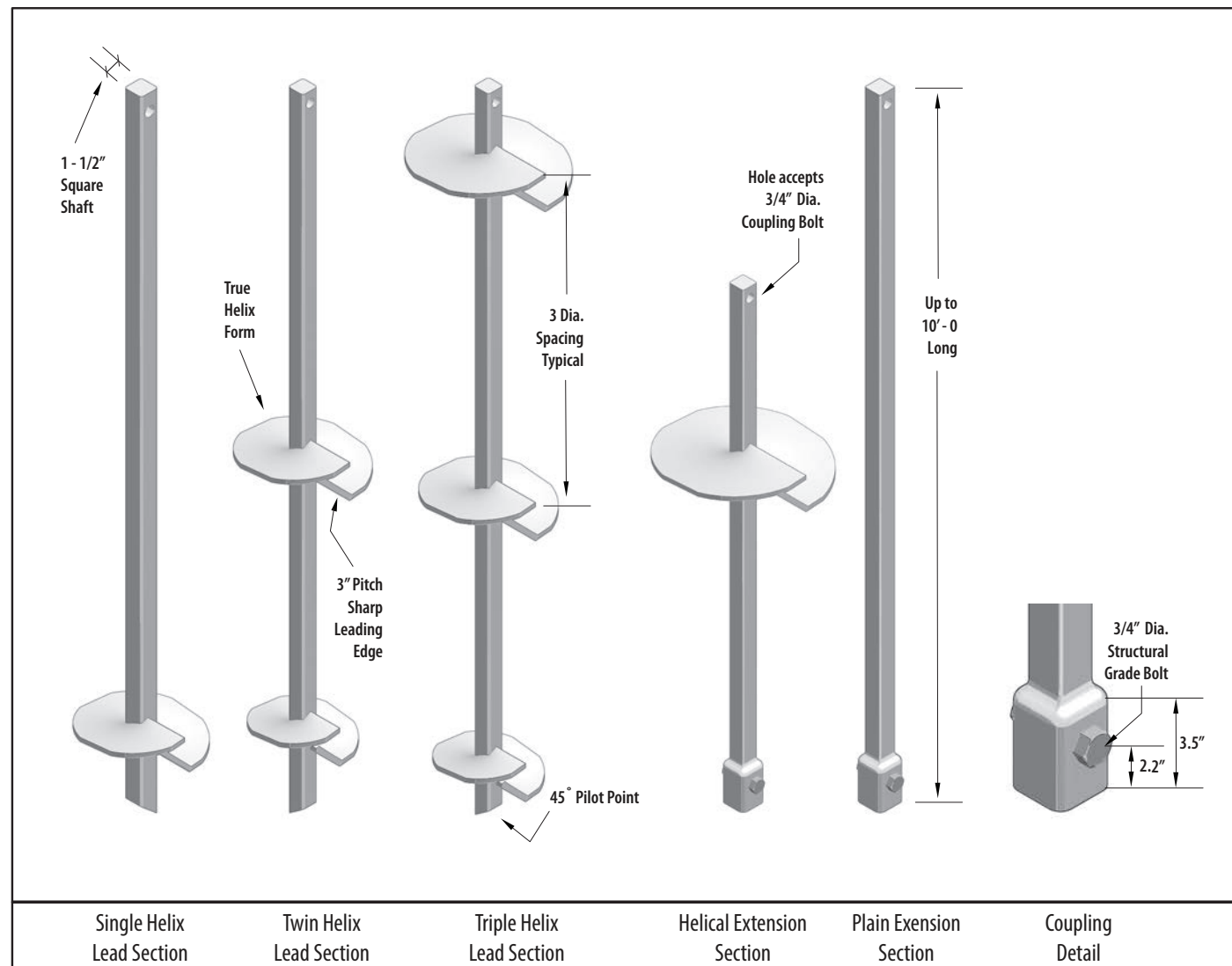
Installation Torque Rating – 5,700 ft-lb

Multi-Purpose 1-1/2 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS5 Helical Piles and Anchors have 57 kip ultimate capacity and 28.5 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.

DRAWINGS & RATINGS



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS5 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 1-1/2 inch solid steel shaft produced exclusively for CHANCE products.

Coupling - forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix - 3/8 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 50 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, 14, or 16 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

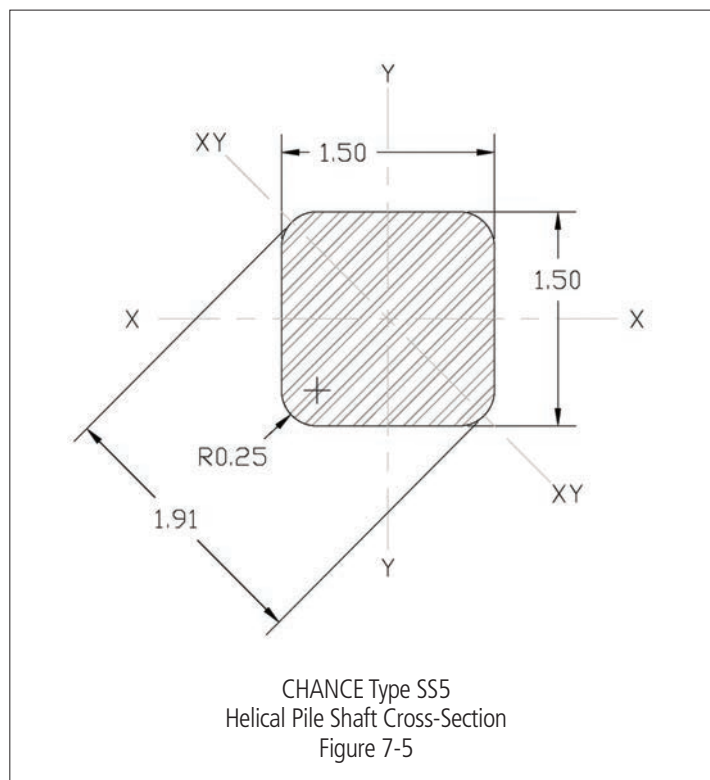
The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

- Single, double, triple, and quad helix Lead Sections, 3, 5, 7, and 10 feet long
- Plain Extensions, 3, 5, 7, and 10 feet long
- Extensions with Helix Plates, 3 and 5 feet long, single helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of SS5 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
6 (150)	0.375 (9.5)	57.3 (254.9)	51.6 (229.5)	28.7 (127.7)
8 (200)	0.375 (9.5)	57.3 (254.9)	51.6 (229.5)	28.7 (127.7)
10 (250)	0.375 (9.5)	47.7 (212.2)	42.9 (190.8)	23.8 (105.6)
12 (300)	0.375 (9.5)	44.2 (196.6)	39.8 (177.0)	22.1 (98.3)
14 (350)	0.375 (9.5)	54.1 (240.7)	48.7 (216.6)	27.1 (120.6)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS5 Helical Pile Lead & Extension Sections^{1,2}

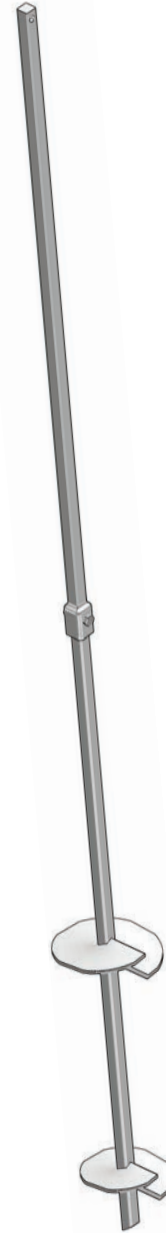
Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		Single 6 & 8 in 54.4 (242.0)	Single 6 & 8 in 48.9 (217.5)	26.6 (118.3)	24.0 (106.8)	13.6 (60.5)	12.2 (54.3)
			For Other Helix Diameters, See Helix Strength Table					
Lead, Multi-Helix	89.8 (399.5)	80.8 (359.4)	54.4 (242.0)	48.9 (219.5)	26.6 (118.3)	24.0 (106.8)	13.6 (60.5)	12.2 (54.3)
Extension	89.8 (399.5)	80.8 (359.4)	54.4 (242.0)	48.9 (219.5)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS5 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1044 with 70 ksi minimum yield strength			
Shaft Size	1.50 in	38 mm	Corroded	
			1.487 in	37.8 mm
Moment of Inertia (I)	0.40 in ⁴	16.5 cm ⁴	Corroded	
			0.38 in ⁴	15.6 cm ⁴
Shaft Area (A)	2.2 in ²	14.2 cm ²	Corroded	
			2.16 in ²	13.94 cm ²
Section Modulus (S _{x-x})	0.53 in ³	8.7 cm ³	Corroded	
			0.40 in ³	6.6 cm ³
Perimeter	5.6 in	14.2 cm	Corroded	
			5.5 in	14 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One ¾ inch Diameter ASTM A325 Type 1 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.375 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 50 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	5,700 ft-lb		7,730 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	70 kip	312 kN	52.5 kip	234 kN
Allowable Tension Strength	35 kip		156 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	57 kip	254 kN	28.5 kip	127 kN



Assembly of SS5
Figure 7-6

ASD Allowable Compression Strengths of CHANCE® Type SS5 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table	See Helix Strength Table	16 (71.2)	8.1 (36.0)
Lead, 2-Helix 8"-10"	52.5 (233.5)	32.6 (145.0)	16 (71.2)	8.1 (36.0)
Lead, 2-Helix 10"-12"	45.9 (204.2)			
Lead, 2-Helix 12"-14"	49.9 (222.0)			
Lead, 2-Helix 14"-14"	53.8 (239.3)			
Lead, Multi-Helix	53.8 (239.3)	32.6 (145.0)	16 (71.2)	8.1 (36.0)
Extension	53.8 (239.3)	32.6 (145.0)	16 (71.2)	8.1 (36.0)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type SS150 Helical Piles and Anchors

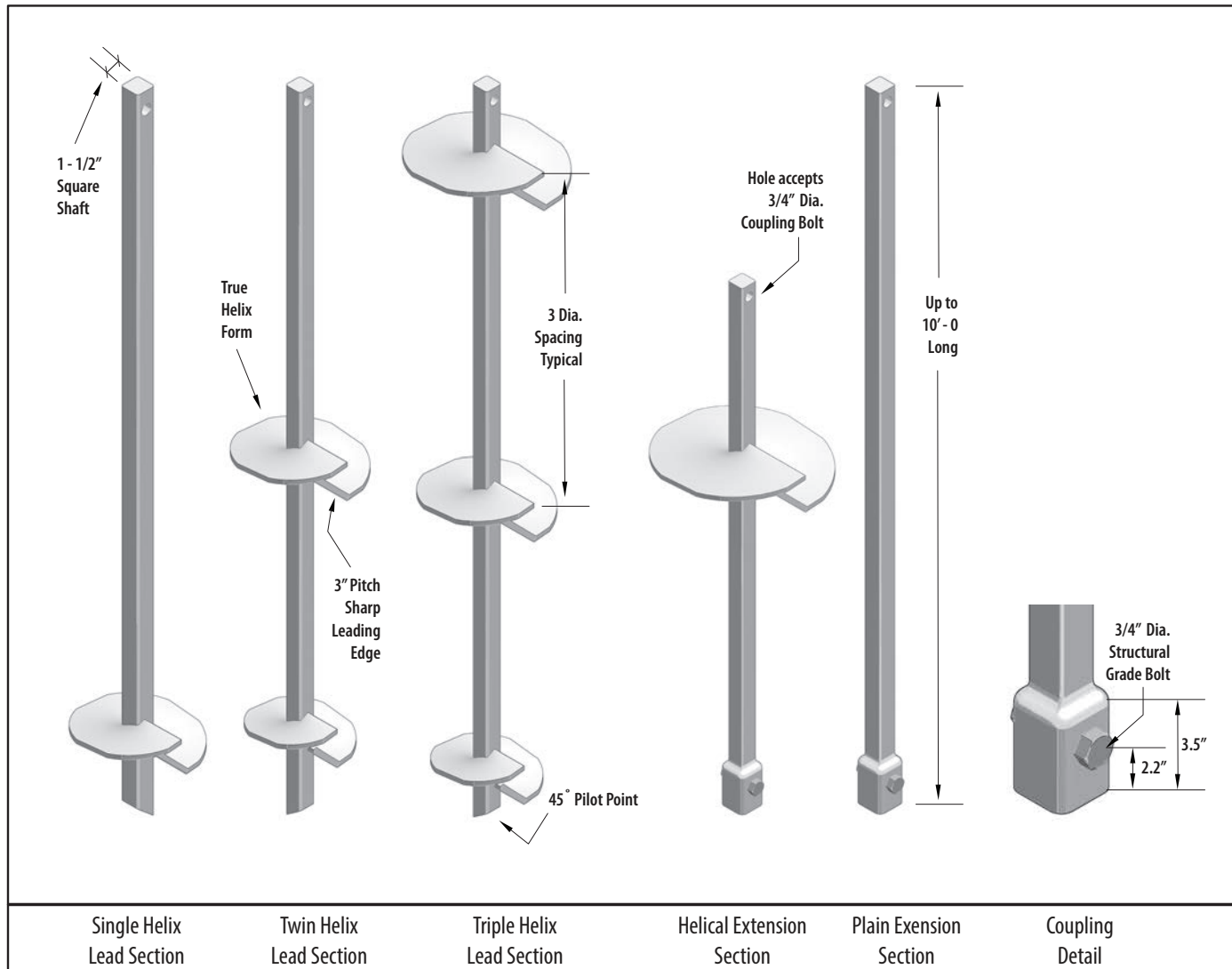
70 kip Ultimate – 35 kip Allowable Capacity

Installation Torque Rating – 7,000 ft-lb

Multi-Purpose 1-1/2 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS150 Helical Piles and Anchors have 70 kip ultimate capacity and 35 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS150 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 1-1/2 inch solid steel shaft produced exclusively for CHANCE products.

Coupling - forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix - 3/8 inch Thick: ASTM A656 or A1018, with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, and 14 inch.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

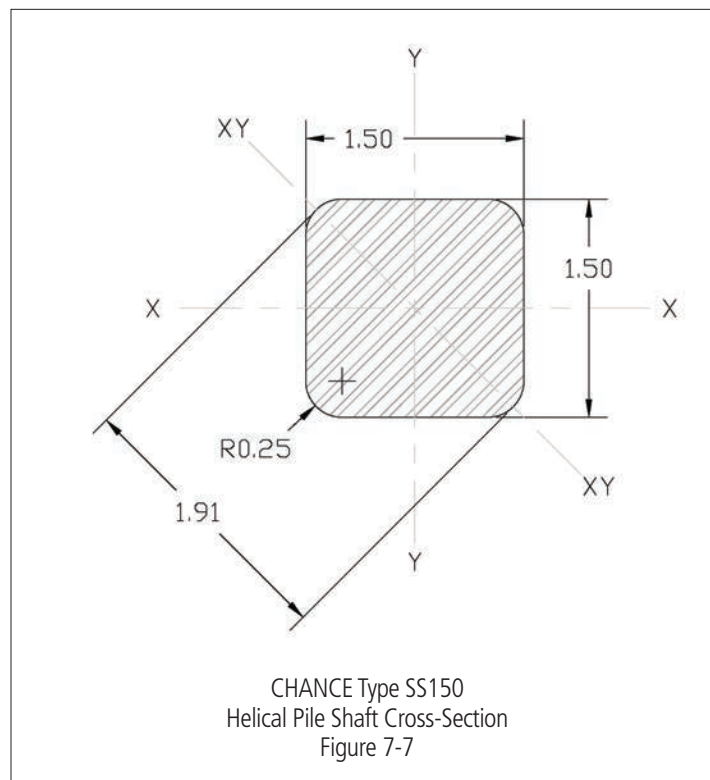
Single, double, triple, and quad helix Lead Sections, 3, 5, 7, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 5, 7, and 10 feet long, single and multi-helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Axial Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of SS150 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength, kip (kN)	LRFD Design Strength, kip (kN)	ASD Allowable Strength, kip (kN)
6 (150)	0.375 (9.5)	57.7 (257)	51.9 (231)	28.8 (128)
8 (200)	0.375 (9.5)	57.7 (257)	51.9 (231)	28.8 (128)
10 (250)	0.375 (9.5)	61.9 (275)	55.7 (248)	30.9 (137)
12 (300)	0.375 (9.5)	49.7 (221)	44.7 (199)	24.8 (110)
14 (350)	0.375 (9.5)	52.9 (235)	47.7 (212)	26.5 (118)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS150 Helical Pile Lead & Extension Sections^{1,2}

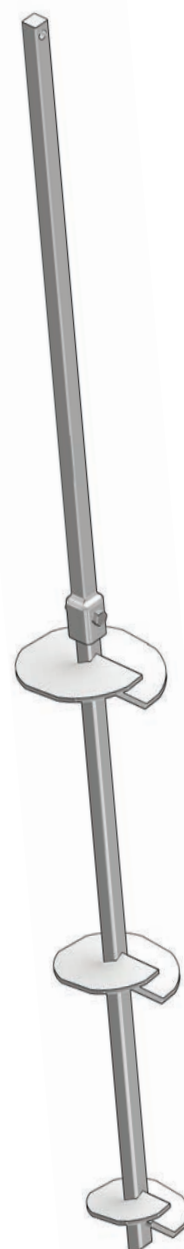
Section Type & Helix Count	Nominal & LRFD Design Compression Strengths, kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		Single 6, 8, or 10 inch – 54.4 (242)	Single 6, 8, or 10 inch – 48.9 (218)	26.6 (118)	24.0 (107)	13.6 (60.5)	12.2 (54)
For Other Helix Diameters, See Helix Strength Table								
Lead, Multi-Helix	99.5 (443)	89.5 (398)	54.4 (242)	48.9 (218)	26.6 (118)	24.0 (107)	13.6 (60.5)	12.2 (54)
Extension								

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS150 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1530 with 90 ksi minimum yield strength			
Shaft Size	1.50 in	38 mm	Corroded	
			1.487 in	37.8 mm
Moment of Inertia (I)	0.40 in ⁴	16.5 cm ⁴	Corroded	
			0.38 in ⁴	15.6 cm ⁴
Shaft Area (A)	2.2 in ²	14.2 cm ²	Corroded	
			2.16 in ²	13.94 cm ²
Section Modulus (S _{x-x})	0.53 in ³	8.7 cm ³	Corroded	
			0.40 in ³	6.6 cm ³
Perimeter	5.6 in	14.2 cm	Corroded	
			5.5 in	14.0 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One 3/4 inch Diameter ASTM A325 Type 1 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.375 inch Thick, Formed on Matching Metal Dies, ASTM A656 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	7,000 ft-lb		9,500 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	70 kip	312 kN	52.5 kip	234 kN
Allowable Tension Strength	35 kip		156 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	70 kip	312 kN	35 kip	156 kN



Assembly of SS150
Figure 7-8

ASD Allowable Compression Strengths of CHANCE® Type SS150 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength, kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table Above	See Helix Strength Table Above	16 (71)	8.1 (36)
Lead, 2-Helix 8"-10"	59.6 (265)	32.6 (145)	16 (71)	8.1 (36)
Lead, 2-Helix 10"-12"	55.7 (248)			
Lead, 2-Helix 12"-14"	51.3 (228)			
Lead, 2-Helix 14"-14"	53.0 (236)			
Lead, Multi-Helix	59.6 (265)			
Extension	59.6 (265)			

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type SS175 Helical Piles and Anchors

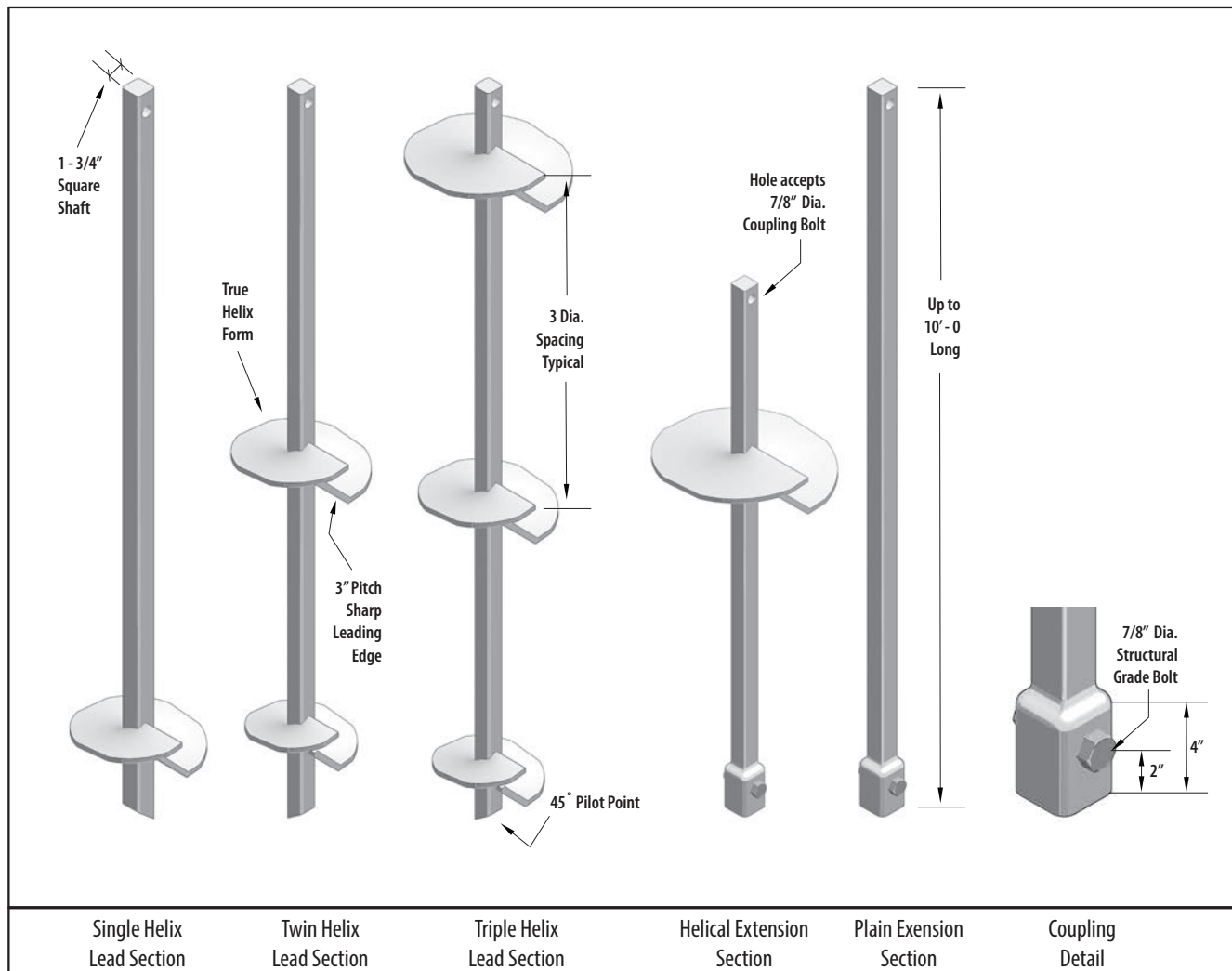
105 kip Ultimate – 52.5 kip Allowable Capacity

Installation Torque Rating – 10,500 ft-lb

Multi-Purpose 1-3/4 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS175 Helical Piles and Anchors have 105 kip ultimate capacity and 52.5 kip working or allowable capacity in compression and 100 kip ultimate capacity and 50 kip working or allowable capacity in tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS175 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 1-3/4 inch solid steel shaft produced exclusively for CHANCE products.

Coupling – forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix - 3/8 & 1/2 inch Thick: ASTM A656, or A1018 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, or 14 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

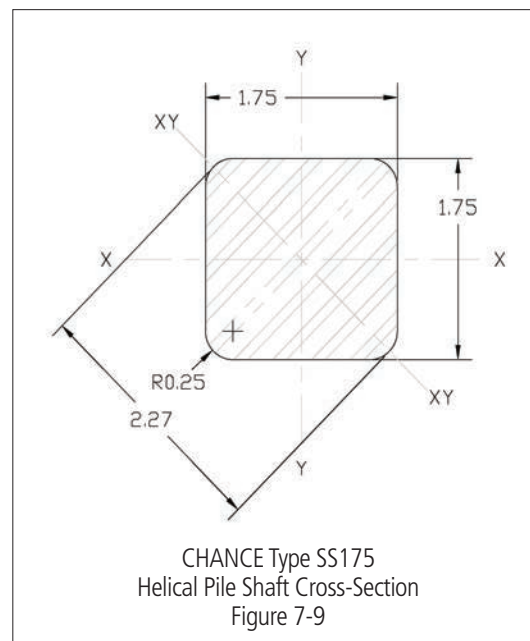
Single, double, triple, and quad helix Lead Sections, 3, 5, 7, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 3, 5, 7, and 10 feet long, single and multi-helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of SS175 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength, kip (kN)	LRFD Design Strength, kip (kN)	ASD Allowable Strength, kip (kN)
6 (150)	0.5 (13)	123.3 (548.5)	111 (493.8)	61.6 (274)
8 (200)	0.5 (13)	123.3 (548.5)	111 (493.8)	61.6 (274)
10 (250)	0.375 (9.5)	66.1 (294)	59.5 (264.7)	33.1 (147.2)
12 (300)	0.375 (9.5)	57.5 (255.8)	51.7 (230)	28.7 (127.7)
14 (350)	0.375 (9.5)	51.8 (230.4)	46.7 (207.7)	25.9 (115.2)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS175 Helical Pile Lead & Extension Sections^{1,2}

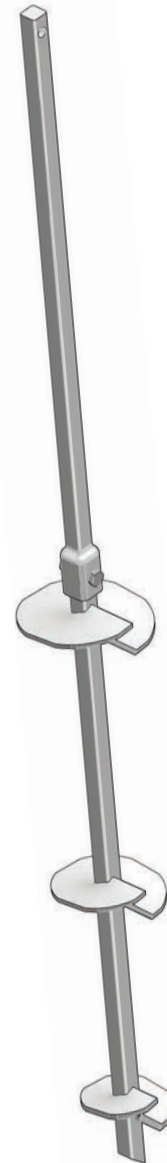
Section Type & Helix Count	Nominal & LRFD Design Compression Strengths, kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		See Helix Strength Table		50.5 (224.6)	45.4 (201.9)	25.8 (114.8)	23.2 (103.2)
Lead, 2-Helix 8"-10"	164.3 (730.8)	147.8 (657.4)	103.0 (458.2)	92.7 (412.4)	50.5 (224.6)	45.4 (201.9)	25.8 (114.8)	23.2 (103.2)
Lead, 2-Helix 10"-12"	123.6 (549.8)	111.2 (494.6)						
Lead, 2-Helix 12"-14"	109.3 (486.2)	98.4 (437.7)						
Lead, 2-Helix 14"-14"	103.6 (460.8)	93.4 (415.5)						
Lead, Multi-Helix	164.3 (730.8)	147.8 (657.4)						
Extension	164.3 (730.8)	147.8 (657.4)						

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS175 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1530 with 90 ksi minimum yield strength			
Shaft Size	1.75 in	44.4 mm	Corroded	
			1.737 in	44 mm
Moment of Inertia (I)	0.75 in ⁴	31.1 cm ⁴	Corroded	
			0.725 in ⁴	30.1 cm ⁴
Shaft Area (A)	3.1 in ²	19.4 cm ²	Corroded	
			2.97 in ²	19.16 cm ²
Section Modulus (S _{x-x})	0.85 in ³	13.9 cm ³	Corroded	
			0.835 in ³	13.65 cm ³
Perimeter	6.6 in	16.7 cm	Corroded	
			6.5 in	16.5 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One 7/8 inch Diameter ASTM A193 Grade B7 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.375 & 0.5 inch Thick, Formed on Matching Metal Dies, ASTM A656 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	10,500 ft-lb		14,240 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	100 kip	445 kN	75 kip	334 kN
Allowable Tension Strength	50 kip		222 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	105 kip	467 kN	52.5 kip	234 kN



Assembly of SS175
Figure 7-10

ASD Allowable Compression Strengths of CHANCE® Type SS150 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength, kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table Above	See Helix Strength Table Above	30.2 (134.3)	15.4 (68.5)
Lead, Single 12" Helix			28.7 (127.7)	
Lead, Single 14" Helix			25.9 (115.2)	
Lead, 2-Helix 8"-10"	94.7 (421.2)	61.7 (274.5)	30.2 (134.3)	15.4 (68.5)
Lead, 2-Helix 10"-12"	61.8 (274.9)	61.7 (274.5)		
Lead, 2-Helix 12"-14"	54.6 (242.9)	54.6 (242.9)		
Lead, 2-Helix 14"-14"	51.8 (230.4)	51.8 (230.4)		
Lead, Multi-Helix	98.4 (437.7)	61.7 (274.5)	30.2 (134.3)	15.4 (68.5)
Extension	98.4 (437.7)	61.7 (274.5)	30.2 (134.3)	15.4 (68.5)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type SS200 Helical Piles and Anchors

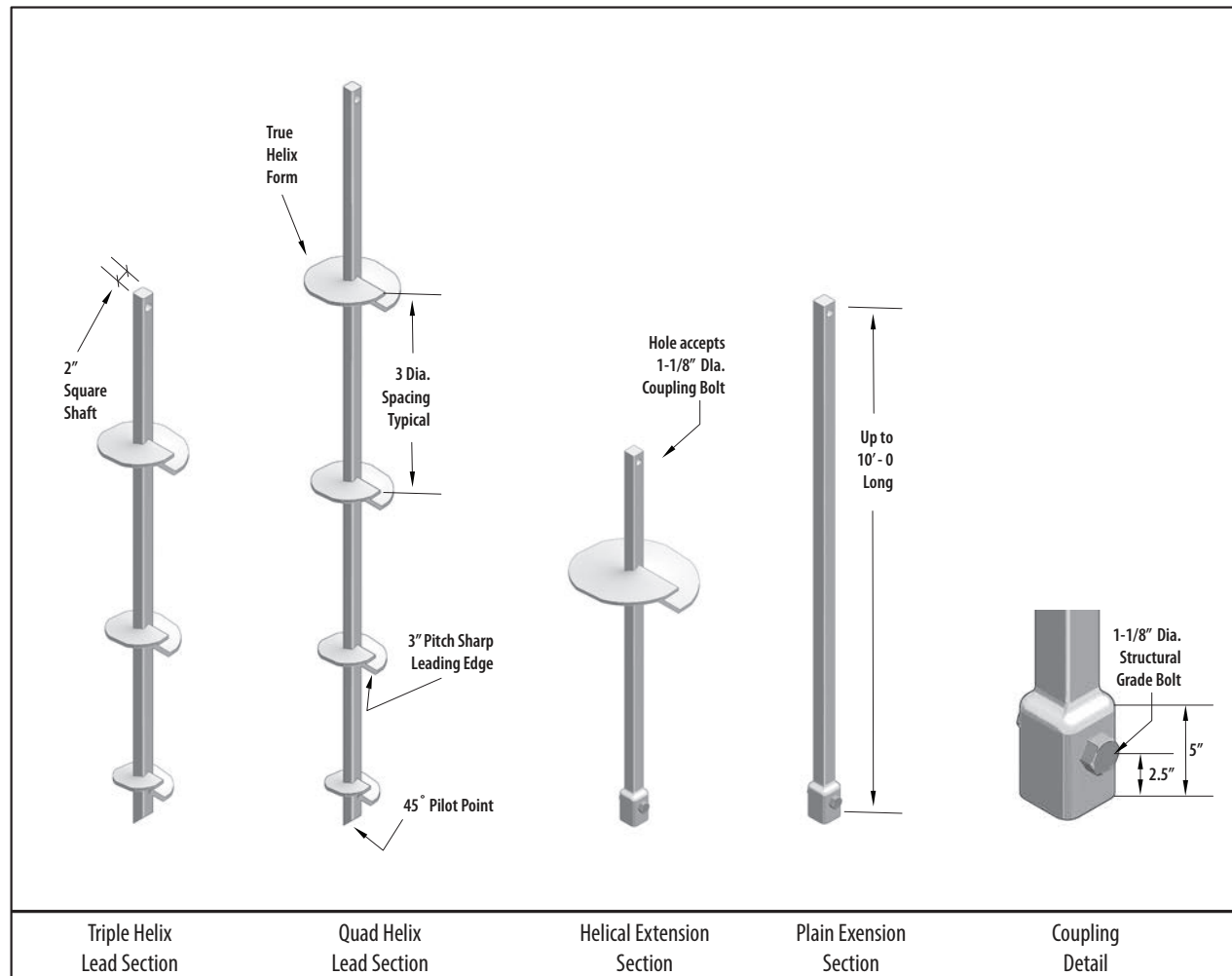
160 kip Ultimate – 80 kip Allowable Capacity

Installation Torque Rating – 16,000 ft-lb

Multi-Purpose 2 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS200 Helical Piles and Anchors have 160 kip ultimate capacity and 80 kip working or allowable capacity in compression and 150 kip ultimate capacity and 75 kip working or allowable capacity in tension. This capacity is based on structural strength ratings and well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS200 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 2 inch solid steel shaft produced exclusively for CHANCE products.

Coupling – forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix – ½ inch Thick: ASTM A656, or A1018 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, and 14 inch.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

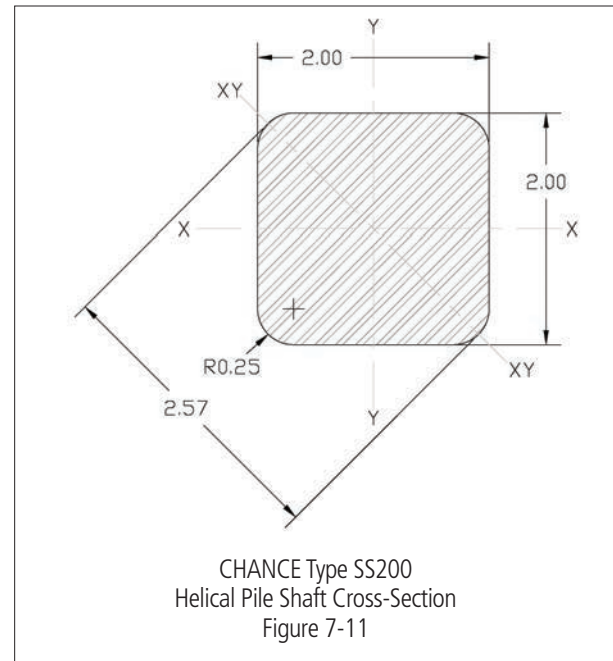
Triple, and quad helix Lead Sections, 5, 7, 8, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 3, 7, and 10 feet long, single and multi-helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Axial deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of SS220 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength, kip (kN)	LRFD Design Strength, kip (kN)	ASD Allowable Strength, kip (kN)
6 (150)	0.5 (13)	154 (685)	138.5 (616.1)	77 (342.5)
8 (200)	0.5 (13)	154 (685)	138.5 (616.1)	77 (342.5)
10 (250)	0.5 (13)	122.8 (546.2)	110.5 (491.5)	61.4 (273.1)
12 (300)	0.5 (13)	131.3 (584)	118.1 (525.3)	65.6 (291.8)
14 (350)	0.5 (13)	115.3 (512.9)	103.8 (461.7)	57.6 (256.2)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS200 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths, kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		See Helix Strength Table		85.6 (380.8)	77.1 (342.9)	43.7 (194.4)	39.3 (174.8)
Lead, 2-Helix 8"-10"	239.6 (1065.8)	215.6 (959)	167.5 (745)	150.8 (670.8)	86.6 (385.2)	77.1 (342.9)	43.7 (194.4)	39.3 (174.8)
Lead, 2-Helix 10"-12"	239.6 (1065.8)	215.6 (959)						
Lead, 2-Helix 12"-14"	239.6 (1065.8)	215.6 (959)						
Lead, 2-Helix 14"-14"	230.6 (1025.8)	207.6 (923.5)						
Lead, Multi-Helix	239.6 (1065.8)	215.6 (959)						
Extension	239.6 (1065.8)	215.6 (959)						

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS200 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1530 with 90 ksi minimum yield strength			
Shaft Size	2 in	51 mm	Corroded	
			1.971 in	50 mm
Moment of Inertia (I)	1.26 in ⁴	52.4 cm ⁴	Corroded	
			1.19 in ⁴	49.53 cm ⁴
Shaft Area (A)	3.9 in ²	25.3 cm ²	Corroded	
			3.81 in ²	24.58 cm ²
Section Modulus (S _{x-x})	1.26 in ³	20.6 cm ³	Corroded	
			1.21 in ³	19.83 cm ³
Perimeter	7.5 in	18.9 cm	Corroded	
			7.36 in	18.69 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One 1-1/8 inch Diameter ASTM A193 Grade B7 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A656 or A1018 Grade 80			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	16,000 ft-lb		21,700 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	150 kip	668 kN	112.5 kip	500 kN
Allowable Tension Strength	75 kip		334 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	160 kip	712 kN	80 kip	356 kN



Assembly of SS200
Figure 7-12

ASD Allowable Compression Strengths of CHANCE® Type SS200 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table Above	See Helix Strength Table Above	51.3 (228.2)	26.2 (116.5)
Lead, 2-Helix 8"-10"	138.4 (615.6)	100.3 (446.1)	51.3 (228.2)	26.2 (116.5)
Lead, 2-Helix 10"-12"	127.0 (765.1)			
Lead, 2-Helix 12"-14"	123.2 (548)			
Lead, 2-Helix 14"-14"	115.2 (512.4)			
Lead, Multi-Helix	143.5 (638.3)	100.3 (446.1)	51.3 (228.2)	26.2 (116.5)
Extension	143.5 (638.3)	100.3 (446.1)	51.3 (228.2)	26.2 (116.5)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type SS225 Helical Piles and Anchors

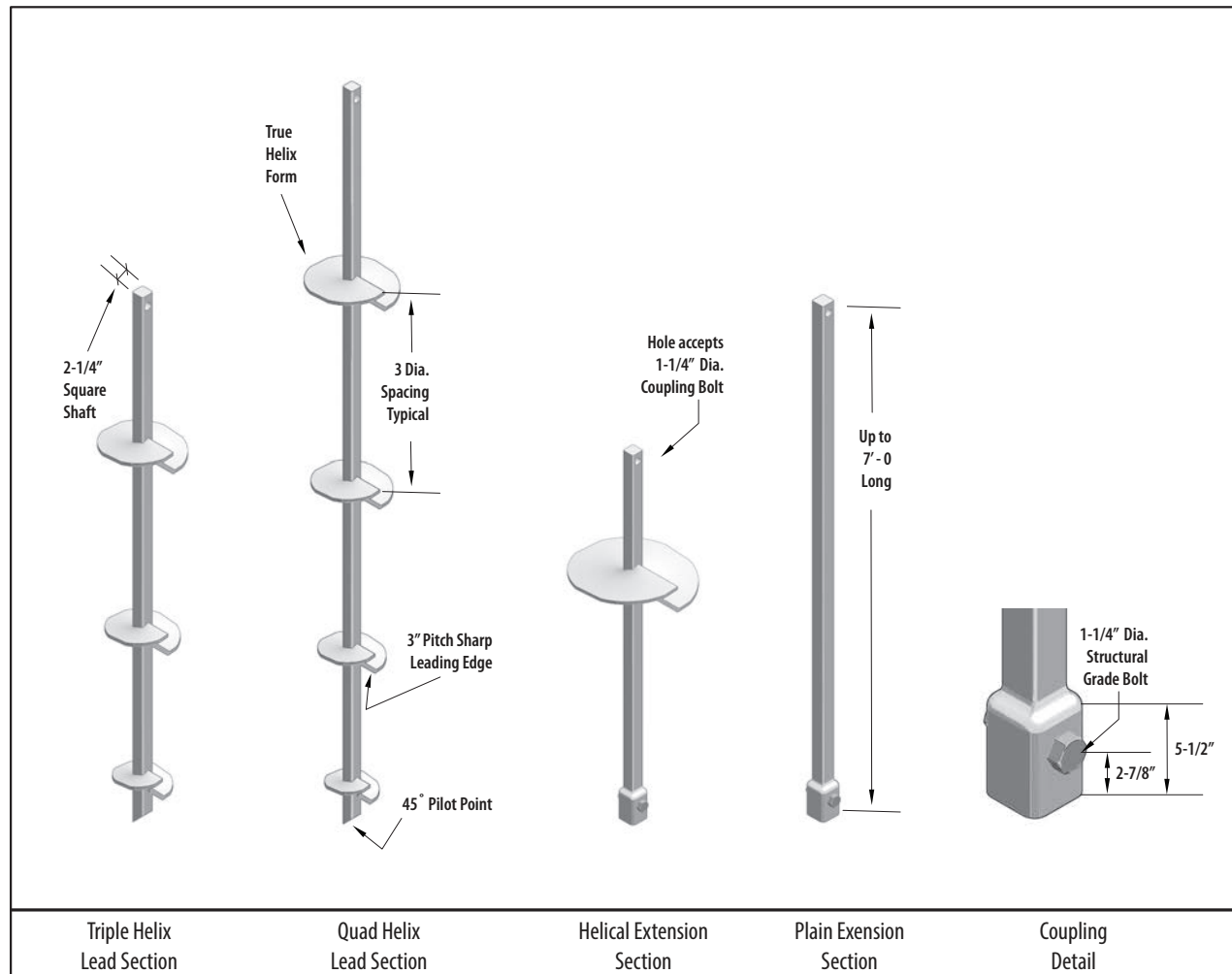
210 kip Ultimate – 105 kip Allowable Capacity

Installation Torque Rating – 21,000 ft-lb

Multi-Purpose 2-1/4 inch Solid Round-Cornered-Square Steel Shaft with integrally formed square upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type SS225 Helical Piles and Anchors have 210 kip ultimate capacity and 105 kip working or allowable capacity in compression and 200 kip ultimate capacity and 100 kip working or allowable capacity in tension. This capacity is based on structural strength ratings and well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Solid square shaft helical piles and anchors provide greater penetration into bearing soils and increased axial capacity in firm soils compared to pipe shaft helical piles with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type SS Helical Piles and Anchors have a longer service life than do pipe shaft piles because of their reduced surface area. CHANCE Type SS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

SS225 Helical Pile and Anchor Specifications & Available Configurations

Shaft – Round-Cornered-Square (RCS) 2-1/4 inch solid steel shaft produced exclusively for CHANCE products.

Coupling - forged as a deep socket from the steel shaft material as an integral part of the extension, connected with structural bolts.

Helix - 1/2 inch Thick: ASTM A656, or A1018 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 6, 8, 10, 12, and 14 inch.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a "sea shell" cut. The "sea shell" cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

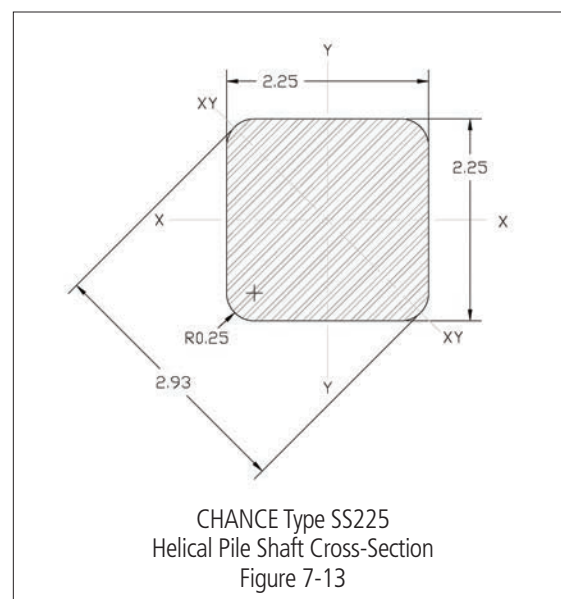
Configurations:

Triple, and quad helix Lead Sections, 5, 7 and 10 feet long

Plain Extensions, 5 and 7 feet long

Extensions with Helix Plates, 5, and 7 feet long, single and multi-helix

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.



NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Axial deflections of 0.25 to 0.50 inches are typical at allowable capacity.

Nominal, LRFD Design and ASD Allowable Strengths of SS225 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
6 (150)	0.5 (13)	188 (836.3)	169.1 (752.2)	94 (418.1)
8 (200)	0.5 (13)	188 (836.3)	169.1 (752.2)	94 (418.1)
10 (250)	0.5 (13)	151.8 (675.2)	136.6 (607.6)	75.9 (337.6)
12 (300)	0.5 (13)	141.3 (628.5)	127.2 (565.8)	70.6 (314)
14 (350)	0.5 (13)	126.3 (561.8)	113.7 (505.8)	63.2 (281.1)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type SS225 Helical Pile Lead & Extension Sections^{1,2}

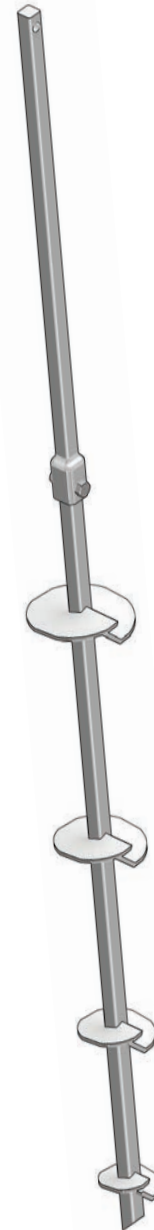
Section Type & Helix Count	Nominal & LRFD Design Compression Strengths, kip (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	See Helix Strength Table		See Helix Strength Table		139.0 (618.3)	125.1 (556.5)	70.9 (315.4)	63.8 (283.8)
					Single 14 inch – 126.3 (561.8)	Single 14 inch – 113.7 (505.8)		
Lead, 2-Helix 8"-10"	331.6 (1475)	298.4 (1327.3)	250.1 (1112.5)	225.1 (1001.3)	139.0 (618.3)	125.1 (556.5)	70.9 (315.4)	63.8 (283.8)
Lead, 2-Helix 10"-12"	293.1 (1303.8)	263.8 (1173.4)						
Lead, 2-Helix 12"-14"	267.6 (1190.3)	240.9 (1071.6)						
Lead, 2-Helix 14"-14"	252.6 (1123.6)	227.4 (1011.5)						
Lead, Multi-Helix	331.6 (1475)	298.4 (1327.3)						
Extension	331.6 (1475)	298.4 (1327.3)						

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

SS225 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled Round-Cornered-Square (RCS) Solid Steel Bars per ASTM A29; modified AISI 1530 with 90 ksi minimum yield strength			
Shaft Size	2.25 in	57 mm	Corroded	
			2.237 in	56.8 mm
Moment of Inertia (I)	2.04 in ⁴	84.9 cm ⁴	Corroded	
			1.99 in ⁴	82.83 cm ⁴
Shaft Area (A)	5.0 in ²	32.1 cm ²	Corroded	
			4.93 in ²	31.81 cm ²
Section Modulus (S _{x-x})	1.81 in ³	29.7 cm ³	Corroded	
			1.79 in ³	29.37 cm ³
Perimeter	8.5 in	21.5 cm	Corroded	
			8.43 in	21.41 cm
Coupling	Integral Forged Square Deep Socket			
Coupling Bolts	One 1-1/4 inch Diameter ASTM A193 Grade B7 Hex Head Bolt with Threads Excluded from Shear Planes			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A656 or A1018 Grade 80			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	10 ft ⁻¹		33 m ⁻¹	
Torque Rating	21,000 ft-lb		28,475 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	200 kip	890 kN	150 kip	667 kN
Allowable Tension Strength	100 kip		445 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	210 kip	934 kN	105 kip	467 kN



Assembly of SS225
Figure 7-14

ASD Allowable Compression Strengths of CHANCE® Type SS225 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kip (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table Above	See Helix Strength Table Above	See Helix Strength Table Above, except single 6 & 8 inch - 83.2 (370.1)	42.5 (189)
Lead, 2-Helix 8"-10"	169.9 (755.8)	149.8 (666.3)	83.2 (370.1)	42.5 (189)
Lead, 2-Helix 10"-12"	146.5 (651.6)	146.5 (650.7)		
Lead, 2-Helix 12"-14"	133.8 (595.1)	133.8 (595.1)		
Lead, 2-Helix 14"-14"	126.4 (562.2)	126.4 (562.3)		
Lead, Multi-Helix	198.6 (883.4)	149.8 (666.3)	83.2 (370.1)	42.5 (189)
Extension	198.6 (883.4)	149.8 (666.3)	83.2 (370.1)	42.5 (189)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type RS2875.203 Helical Piles

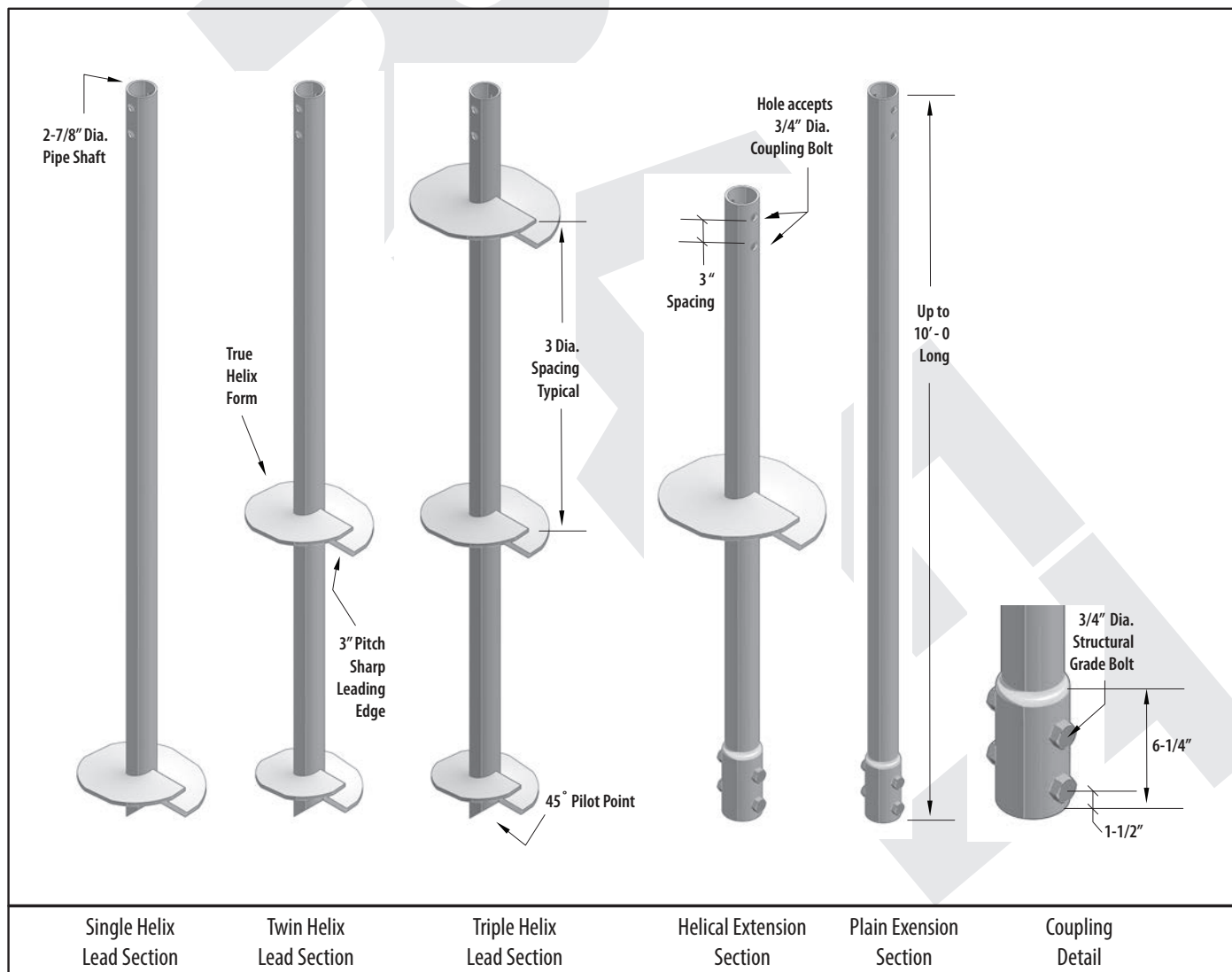
49.5 kip Ultimate – 24.75 kip Allowable Capacity

Installation Torque Rating – 5,500 ft-lb

Multi-Purpose 2-7/8" Diameter, 0.203" Wall, Round HSS Shaft with integrally formed upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type RS2875.203 Helical Piles have 49.5 kip ultimate capacity and 24.75 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS2875.203 Helical Pile Specifications & Available Configurations

Shaft – HSS 2-7/8 inch OD x 0.203 inch (schedule 40) wall steel shaft produced exclusively for CHANCE products.

Coupling – forged as an integral part of the plain and helical extension material as round deep sockets connected with multiple structural bolts.

Helix – 3/8 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 50 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for Helical Piles and Anchors.

Available Helix Diameters: 8, 10, 12, or 14 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

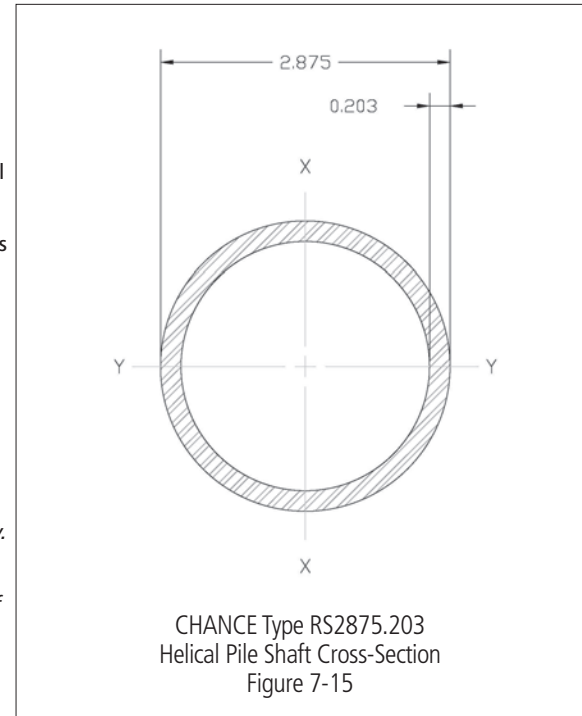
Single, double, and triple helix Lead Sections, 5, 7, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 5 and 7 feet long

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of RS2875.203 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
8 (200)	0.375 (9.5)	85.8 (381.7)	77.2 (343.4)	42.9 (190.8)
10 (250)	0.375 (9.5)	73.6 (327.4)	66.3 (294.9)	36.8 (163.7)
12 (300)	0.375 (9.5)	75.6 (336.3)	68.0 (302.5)	37.8 (168.1)
14 (350)	0.375 (9.5)	61.0 (271.3)	54.9 (244.2)	30.5 (135.7)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type RS2875.203 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kips (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	69.0 (306.9)	62.1 (276.2)	64.3 (286.0)	57.9 (257.6)	55.5 (246.9)	49.9 (222.0)	42.0 (186.8)	37.8 (168.1)
	For Single 14"– 61 (271.3)	For Single 14"– 54.9 (244.2)	For Single 14"– 61.0 (271.3)	For Single 14"– 57.9 (257.6)				
Lead, Multi-Helix	69.0 (306.9)	62.1 (276.2)	64.3 (286.0)	57.9 (257.6)	55.5 (246.9)	49.9 (222.0)	42.0 (186.8)	37.8 (168.1)
Extension	69.0 (306.9)	62.1 (276.2)	64.3 (286.0)	57.9 (257.6)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

RS2875.203 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 2-1/2 inch Nominal Schedule 40 (0.203 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	2.875 in	73 mm	Corroded	
			2.862 in	72.7 mm
Shaft Size, ID*	2.497 in	63.4 mm	Corroded	
			2.510 in	63.75 mm
Moment of Inertia (I)*	1.44 in ⁴	59.9 cm ⁴	Corroded	
			1.344 in ⁴	55.9 cm ⁴
Shaft Area (A)*	1.59 in ²	10.3 cm ²	Corroded	
			1.48 in ²	9.57 cm ²
Section Modulus (S _{x-x})*	1.0 in ³	16.4 cm ³	Corroded	
			0.939 in ³	15.4 cm ³
Perimeter	9.0 in	22.8 cm	Corroded	
			8.99 in	22.8 cm
Coupling	Integral Forged Round Deep Socket Sleeve			
Coupling Bolts	Two ¾ in Diameter SAE J429 Grade 5 Hex Head Bolts with Threads Excluded from Shear Planes			
Helix Plates	0.375 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 50 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	9 ft ⁻¹		30 m ⁻¹	
Torque Rating	5,500 ft-lb		7,500 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	60 kip	267 kN	45 kip	200 kN
Allowable Tension Strength	30 kip		133 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	49.5 kip	220 kN	24.75 kip	110 kN

* computed with 93% of wall thickness per AISC 360-10, B4.2

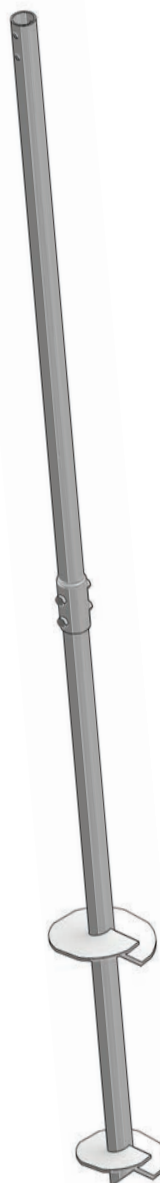
ASD Allowable Compression Strengths of CHANCE® Type RS2875.203 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kips (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	For Single 8" – 41.3 (183.7)	For Single 8" – 38.5 (171.3)	33.2 (147.7)	25.1 (111.7)
	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 10", 12" & 14"	For Single 14" – 30.5 (135.7)	
Lead, 2-Helix 8"-10"	41.3 (183.7)	38.5 (171.3)	33.2 (147.7)	25.1 (111.7)
Lead, 2-Helix 10"-12"				
Lead, 2-Helix 12"-14"				
Lead, 2-Helix 14"-14"				
Lead, Multi-Helix	41.3 (183.7)	38.5 (171.3)	33.2 (147.7)	25.1 (111.7)
Extension	41.3 (183.7)	38.5 (171.3)	33.2 (147.7)	25.1 (111.7)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.



Assembly of RS2875.203
Figure 7-16

CHANCE® Type RS2875.276 Helical Piles

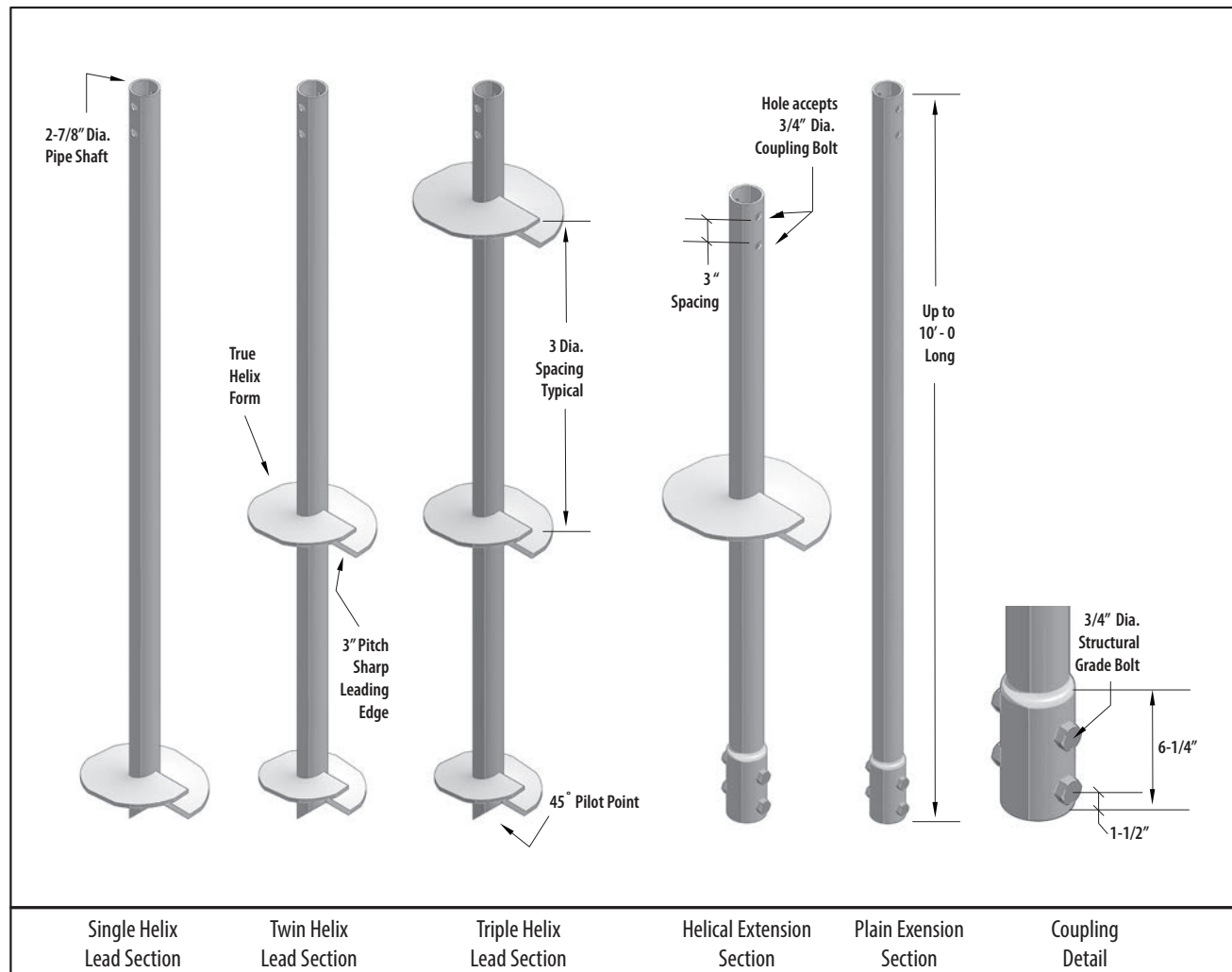
72 kip Ultimate – 36 kip Allowable Capacity

Installation Torque Rating – 8,000 ft-lb

Multi-Purpose 2-7/8" Diameter, 0.276" Wall, Round HSS Shaft with integrally formed upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type RS2875.276 Helical Piles have 72 kip ultimate capacity and 36 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS2875.276 Helical Pile Specifications & Available Configurations

Shaft – HSS 2-7/8 inch OD x 0.276 inch (schedule 80) wall steel shaft produced exclusively for CHANCE products.

Coupling – forged as an integral part of the plain and helical extension material as round deep sockets connected with multiple structural bolts.

Helix – 3/8 inch Thick: ASTM A656, or A1018 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for CHANCE Helical Piles and Anchors.

Available Helix Diameters: 8, 10, 12, or 14 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

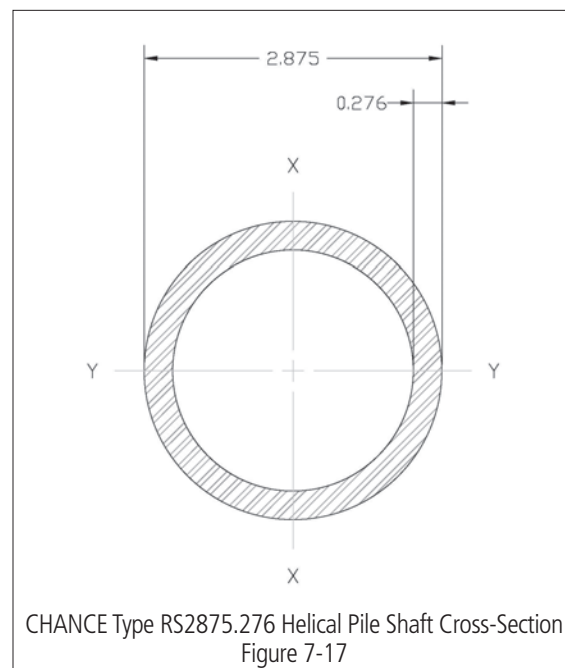
Single, double, and triple and quad helix Lead Sections, 3.5, 5, 7, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 3 feet long

Helical products are Hot Dip Galvanized per ASTM A153 Class B-1.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of RS2875.276 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
8 (200)	0.375 (9.5)	121.4 (540.0)	109.3 (486.2)	60.7 (270.0)
10 (250)	0.375 (9.5)	98.9 (439.9)	89.0 (395.9)	49.5 (220.2)
12 (300)	0.375 (9.5)	85.3 (379.4)	76.8 (341.6)	42.7 (189.9)
14 (350)	0.375 (9.5)	53.7 (238.9)	48.3 (214.9)	26.9 (119.7)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type RS2875.276 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kips (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	92.9 (413.2)	83.6 (371.9)	86.3 (383.9)	77.7 (345.6)	73.9 (328.7)	66.5 (295.8)	55.2 (245.5)	49.7 (221.1)
	See Helix Table Above For Single 12" & 14"				See Helix Table Above For Single 14"			
Lead, Multi-Helix	92.9 (413.2)	83.6 (371.9)	86.3 (383.9)	77.7 (345.6)	73.9 (328.7)	66.5 (295.8)	55.2 (245.5)	49.7 (221.1)
Extension	92.9 (413.2)	83.6 (371.9)	86.3 (383.9)	77.7 (345.6)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

RS2875.276 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 2-1/2 inch Nominal Schedule 80 (0.276 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	2.875 in	73 mm	Corroded	
			2.862 in	72.7 mm
Shaft Size, ID*	2.36 in	60 mm	Corroded	
			2.375 in	60.3 mm
Moment of Inertia (I)*	1.83 in ⁴	76.2 cm ⁴	Corroded	
			1.733 in ⁴	72.1 cm ⁴
Shaft Area (A)*	2.11 in ²	13.6 cm ²	Corroded	
			2.0 in ²	12.9 cm ²
Section Modulus (S _{x-x})*	1.27 in ³	20.8 cm ³	Corroded	
			1.21 in ³	19.8 cm ³
Perimeter	9.0 in	22.8 cm	Corroded	
			8.99 in	22.8 cm
Coupling	Integral Forged Round Deep Socket Sleeve			
Coupling Bolts	Two ¾ in Diameter SAE J429 Grade 5 Hex Head Bolts with Threads Excluded from Shear Planes			
Helix Plates	0.375 inch Thick, Formed on Matching Metal Dies, ASTM A656 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A153 Class B-1, 3.1 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	9 ft ⁻¹		30 m ⁻¹	
Torque Rating	8,000 ft-lb		10,846 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	90 kip	400 kN	67.5 kip	300 kN
Allowable Tension Strength	45 kip		200 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	72 kip	320 kN	36 kip	160 kN

* computed with 93% of wall thickness per AISC 360-10, B4.2

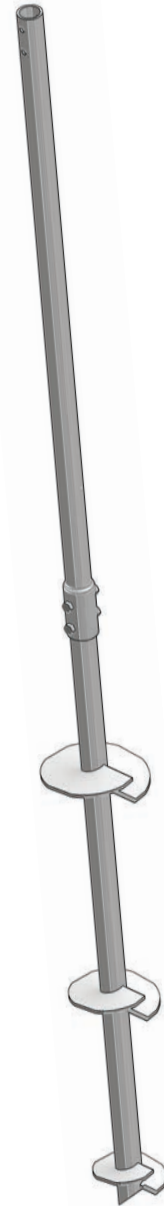
ASD Allowable Compression Strengths of CHANCE® Type RS2875.276 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kips (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	For Single 8" – 55.6 (247.3)	For Single 8" – 51.7 (230.0)	44.3 (197.1)	33.0 (146.8)
	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 12" & 14"	For Single 14" – 26.9
Lead, 2-Helix 8"-10"	55.6 (247.3)	51.7 (230.0)	44.3 (197.1)	33.0 (146.8)
Lead, 2-Helix 10"-12"				
Lead, 2-Helix 12"-14"				
Lead, 2-Helix 14"-14"	55.6 (247.3)	51.7 (230.0)	44.3 (197.1)	33.0 (146.8)
Lead, Multi-Helix				
Extension	55.6 (247.3)	51.7 (230.0)	44.3 (197.1)	33.0 (146.8)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.



Assembly of RS2875.276
Figure 7-18

CHANCE® Type RS3500.300 Helical Piles

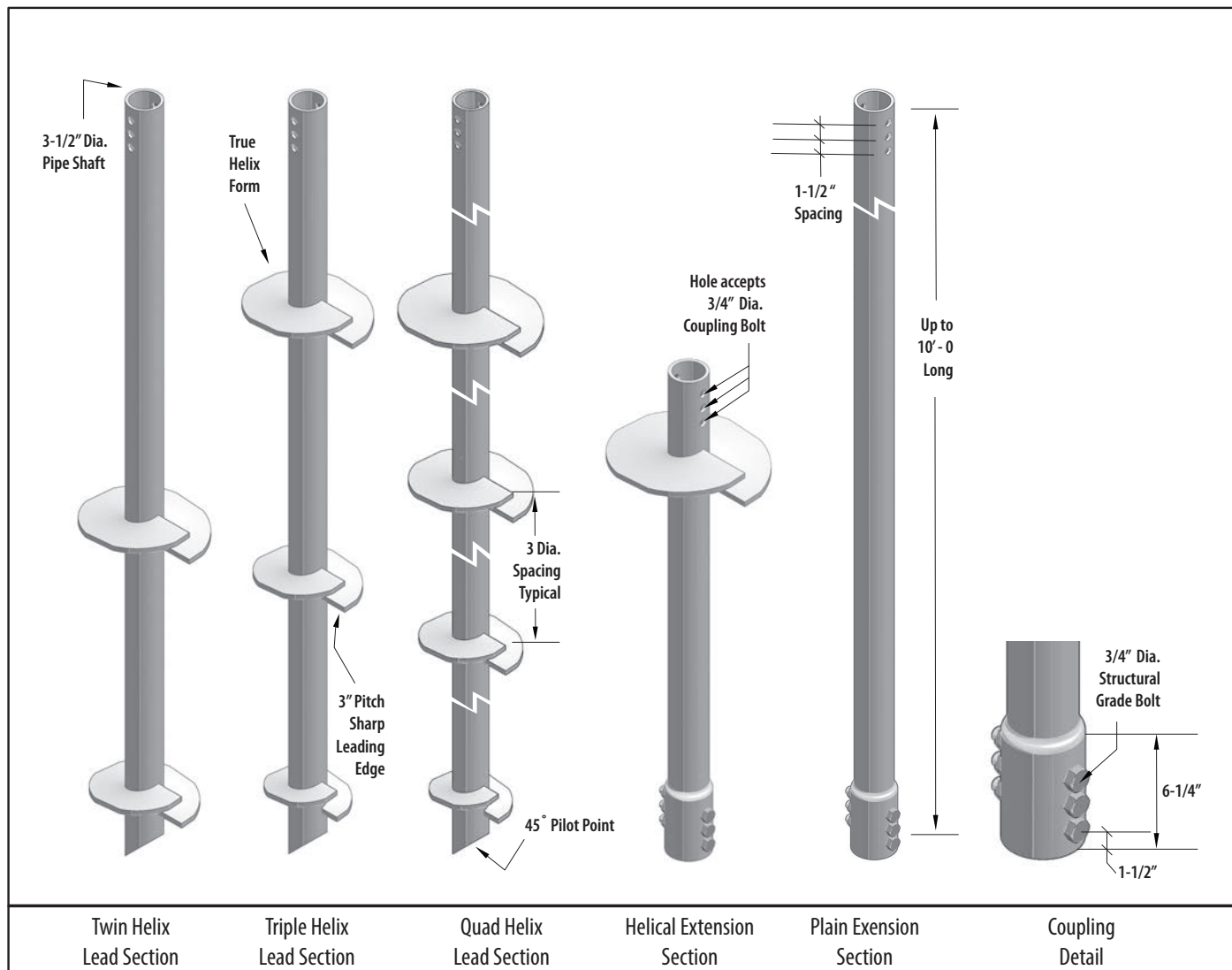
91 kip Ultimate – 45.5 kip Allowable Capacity

Installation Torque Rating – 13,000 ft-lb

Multi-Purpose 3-1/2" Diameter, 0.300" Wall, Round HSS Shaft with integrally formed upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type RS3500.300 Helical Piles have 91 kip ultimate capacity and 45.5 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS3500.300 Helical Pile Specifications & Available Configurations

Shaft – HSS 3-1/2 inch OD x 0.300 inch (schedule 80) wall steel shaft produced exclusively for CHANCE products.

Coupling - forged as an integral part of the plain and helical extension material as round deep sockets connected with multiple structural bolts.

Helix – 1/2 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 50 ksi.

3 inch Helix Pitch – a Standard established by Hubbell Power Systems, Inc. for CHANCE Helical Piles and Anchors.

Available Helix Diameters: 8, 10, 12, 14 or 16 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

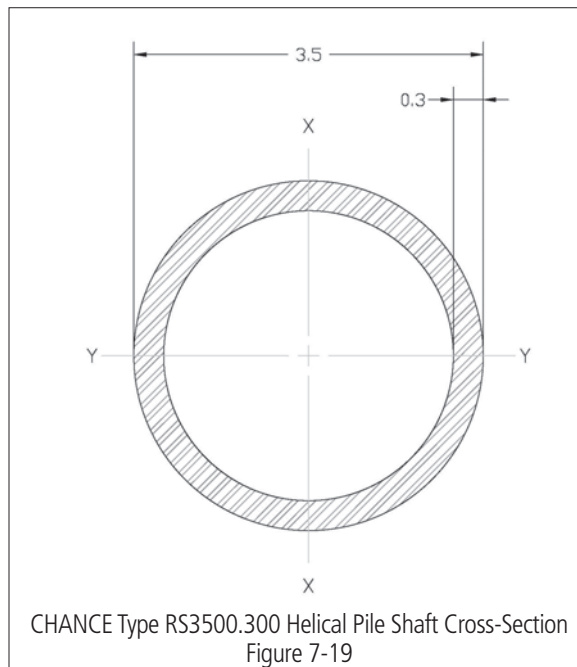
Single, double, triple, and quad helix Lead Sections, 3, 5, 7, and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 3-1/2 7 and 10 feet long

Helical products are Hot Dip Galvanized per ASTM A123 Grade 75.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



CHANCE Type RS3500.300 Helical Pile Shaft Cross-Section
Figure 7-19

Nominal, LRFD Design and ASD Allowable Strengths of RS3500.300 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
8 (200)	0.5 (13)	158.3 (704.2)	142.4 (633.4)	79.1 (351.9)
10 (250)	0.5 (13)	132.5 (589.3)	119.3 (530.7)	66.3 (294.9)
12 (300)	0.5 (13)	98.4 (437.7)	88.6 (394.1)	49.2 (187.7)
14 (350)	0.5 (13)	132.3 (588.5)	119.0 (529.3)	66.2 (294.5)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type RS3500.300 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kips (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	128.0 (569.4)	115.2 (512.4)	121.9 (542.2)	109.7 (488.0)	110.0 (489.3)	99.0 (440.3)	90.7 (403.5)	81.6 (363.0)
	For Single 12" – 98.4 (437.7)	For Single 12" – 88.6 (394.1)	For Single 12" – 98.4 (437.7)	For Single 12" – 88.6 (394.1)	For Single 12" – 98.4 (437.7)	For Single 12" – 88.6 (394.1)		
Lead, Multi-Helix	128 (569.4)	115.2 (512.4)	121.9 (542.2)	109.7 (488.0)	110.0 (489.3)	99.0 (440.4)	90.7 (403.5)	81.6 (363.0)
Extension	128.0 (569.4)	115.2 (512.4)	121.9 (542.2)	109.7 (488.0)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

RS3500.300 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 3 inch Nominal Schedule 80 (0.300 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	3.5 in	89 mm	Corroded	
			3.487 in	63.2 mm
Shaft Size, ID*	2.942 in	74.7 mm	Corroded	
			2.955 in	75.1 mm
Moment of Inertia (I)*	3.69 in ⁴	153.6 cm ⁴	Corroded	
			3.514 in ⁴	146.3 cm ⁴
Shaft Area (A)*	2.82 in ²	18.2 cm ²	Corroded	
			2.692 in ²	17.4 cm ²
Section Modulus (S _{x-x})*	2.11 in ³	34.5 cm ³	Corroded	
			2.016 in ³	33.0 cm ³
Perimeter	11.0 in	27.9 cm	Corroded	
			10.95 in	27.8 cm
Coupling	Integral Forged Round Deep Socket Sleeve			
Coupling Bolts	Three ¾ in Dia. SAE J429 Grade 5 Hex Head Bolts with Threads Excluded from Shear Planes			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 50 or better			
Coatings	Hot Dip Galvanized per ASTM A123 Grade 75, 3.0 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	7 ft ⁻¹		23 m ⁻¹	
Torque Rating	13,000 ft-lb		17,600 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	120 kip	534 kN	90 kip	400 kN
Allowable Tension Strength	60 kip		261 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	91 kip	405 kN	45.5 kip	202.5 kN

* computed with 93% of wall thickness per AISC 360-10, B4.2

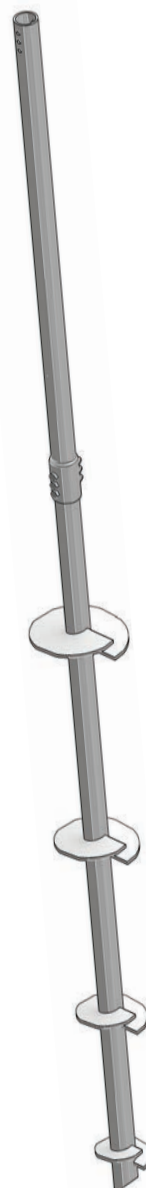
ASD Allowable Compression Strengths of CHANCE® Type RS3500.300 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kips (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	For Single 8" – 76.6 (340.7)	For Single 8" – 73.0 (324.7)	65.9 (293.1)	54.3 (241.5)
	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 10", 12" & 14"	For Single 12" – 49.2 (218.9)	For Single 12" – 49.2 (218.9)
Lead, 2-Helix 8"-10"	76.6 (340.7)	73.0 (324.7)	65.9 (293.1)	54.3 (241.5)
Lead, 2-Helix 10"-12"				
Lead, 2-Helix 12"-14"				
Lead, 2-Helix 14"-14"	76.6 (340.7)	73.0 (324.7)	65.9 (293.1)	54.3 (241.5)
Lead, Multi-Helix				
Extension	76.6 (340.7)	73.0 (324.7)	65.9 (293.1)	54.3 (241.5)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.



Assembly of RS3500.300
Figure 7-20

CHANCE® Type RS4500.337 Helical Piles

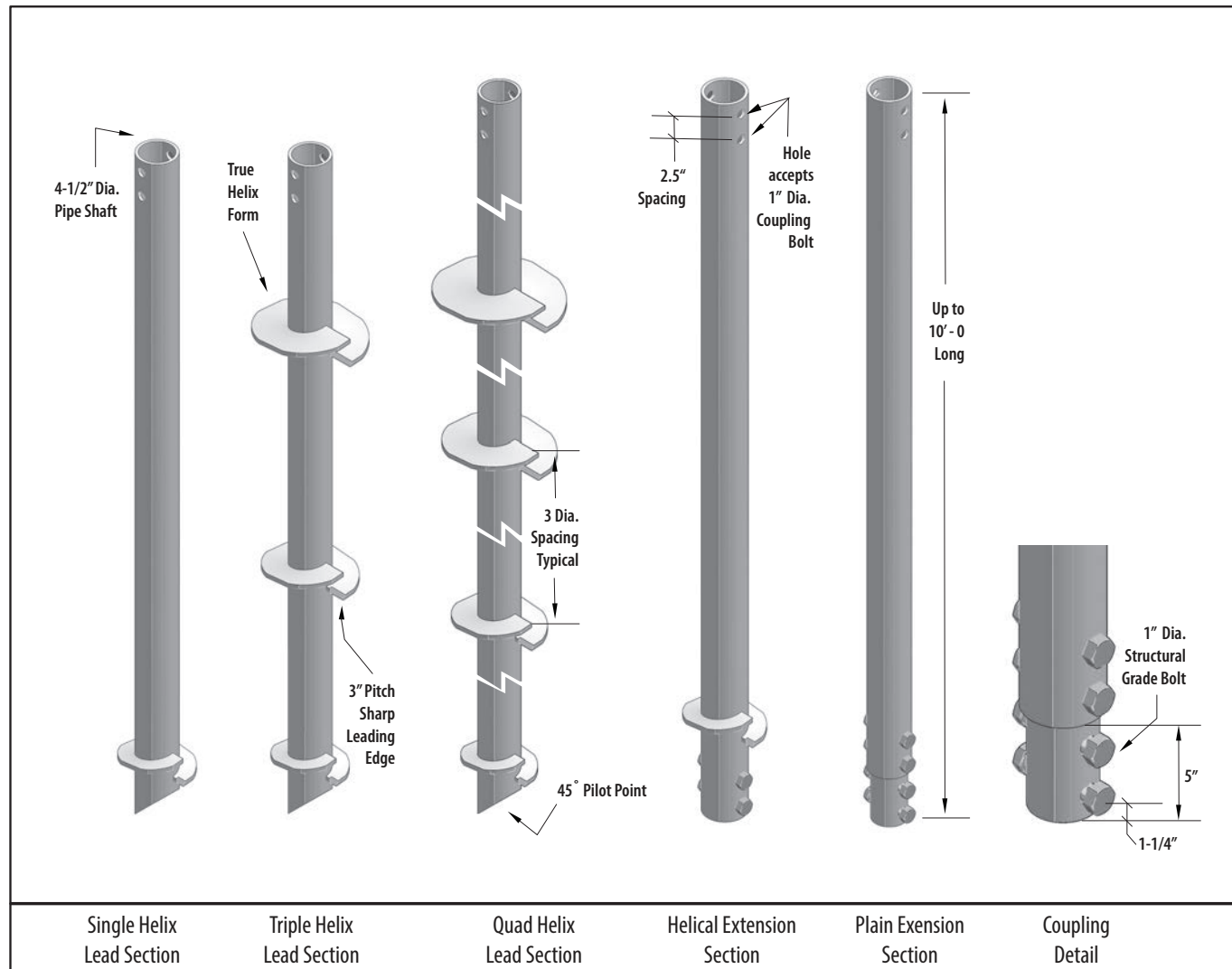
138 kip Ultimate – 69 kip Allowable Capacity

Installation Torque Rating – 23,000 ft-lb

Multi-Purpose 4-1/2" Diameter, 0.337" Wall, Round HSS Shaft with integrally formed upset sockets

Description:

Hubbell Power Systems, Inc., CHANCE Type RS4500.337 Helical Piles have 138 kip ultimate capacity and 69 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS4500.337 Helical Pile Specifications & Available Configurations

Shaft – HSS 4-1/2 inch OD x 0.337 inch (schedule 80) wall steel shaft produced exclusively for CHANCE products.

Coupling – internal sleeve consisting of precision matched steel tube section connected with multiple structural bolts.

Helix – 1/2 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a Standard established by Hubbell Power Systems, Inc. for CHANCE Helical Piles and Anchors.

Available Helix Diameters: 8, 10, 12, 14, 16, or 20 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The Standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

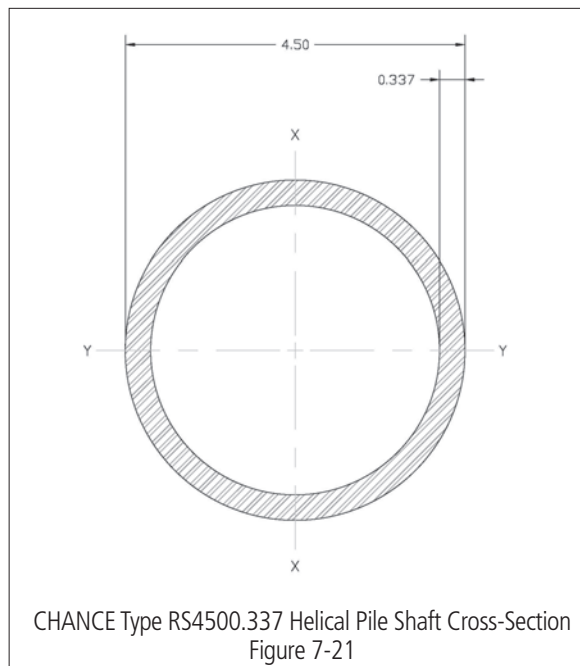
Single, double, triple, and quad helix Lead Sections, 7 and 10 feet long

Plain Extensions, 3, 5, 7, and 10 feet long

Extensions with Helix Plates, 5, 7 and 10 feet long

Helical products are Hot Dip Galvanized per ASTM A123 Grade 75.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



Nominal, LRFD Design and ASD Allowable Strengths of RS4500.337 Helix Plates for Shaft Axial Tension and Compression¹

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
8 (200)	0.5 (13)	244.5 (1087.6)	220.1 (979.1)	122.3 (499.5)
10 (250)	0.5 (13)	200.3 (891.0)	180.3 (802.0)	100.2 (445.7)
12 (300)	0.5 (13)	168.5 (749.5)	151.7 (674.8)	84.3 (375.0)
14 (350)	0.5 (13)	133.0 (591.6)	119.7 (532.5)	66.5 (295.8)

For SI: 1 kip = 4.448 kN.

¹Capacities based on a design corrosion level of 50-years.

Nominal and LRFD Design Compression Strengths of CHANCE® Type RS4500.337 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kips (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design	Nominal	Design	Nominal	Design	Nominal	Design
Lead, Single Helix	191.7 (852.7)	172.6 (767.7)	186.3 (828.7)	167.7 (746.0)	175.3 (779.8)	157.8 (701.9)	156.3 (695.3)	140.7 (625.9)
	See Helix Strength Table Above For Single 12" & 14"						For Single 14" – 133.0 (591.6)	For Single 14" – 119.7 (532.5)
Lead, Multi-Helix	191.7 (852.7)	172.6 (767.8)	186.3 (828.7)	167.7 (746.0)	175.3 (779.8)	157.8 (701.9)	156.3 (695.3)	140.7 (625.9)
Extension	191.7 (852.7)	172.6 (767.8)	186.3 (828.7)	167.7 (746.0)				

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

RS4500.337 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 4 inch Nominal Schedule 80 (0.337 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	4.5 in	114 mm	Corroded	
			4.487 in	114 mm
Shaft Size, ID*	3.874 in	98.4 mm	Corroded	
			3.886 in	98.7 mm
Moment of Inertia (I)*	9.07 in ⁴	377.5 cm ⁴	Corroded	
			8.701 in ⁴	362.2 cm ⁴
Shaft Area (A)*	4.12 in ²	26.6 cm ²	Corroded	
			3.951 in ²	25.5 cm ²
Section Modulus (S _{x-x})*	4.03 in ³	66.1 cm ³	Corroded	
			3.878 in ³	63.6 cm ³
Perimeter	14.1 in	35.9 cm	Corroded	
			14.09 in	35.8 cm
Coupling	Internal Sleeve Steel Tube Section			
Coupling Bolts	Four 1 in Dia. SAE J429 Grade 8 Hex Head Bolts			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A123 Grade 75, 3.0 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	6 ft ⁻¹		20 m ⁻¹	
Torque Rating	23,000 ft-lb		31,200 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	160 kip	712 kN	120 kip	534 kN
Allowable Tension Strength	80 kip		356 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	138 kip	614 kN	69 kip	307 kN

* computed with 93% of wall thickness per AISC 360-10, B4.2



Assembly of RS4500.337
Figure 7-22

ASD Allowable Compression Strengths of CHANCE® Type RS4500.337 Helical Pile Lead & Extension Sections^{1,2}

Section Type & Helix Count	ASD Allowable Axial Compression Strength kips (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	For Single 8" – 114.8 (551.7)	For Single 8" – 111.6 (496.4)	105.0 (467.1)	93.6 (416.4)
	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 10", 12" & 14"	See Helix Strength Table Above for 12" & 14"
Lead, 2-Helix 8"-10"	114.8 (551.7)	111.6 (496.4)	105.0 (467.1)	93.6 (416.4)
Lead, 2-Helix 10"-12"				
Lead, 2-Helix 12"-14"				
Lead, 2-Helix 14"-14"				
Lead, Multi-Helix	114.8 (551.7)	111.6 (496.4)	105.0 (467.1)	93.6 (416.4)
Extension	114.8 (551.7)	111.6 (496.4)	105.0 (467.1)	93.6 (416.4)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

CHANCE® Type RS6625.280 Helical Piles

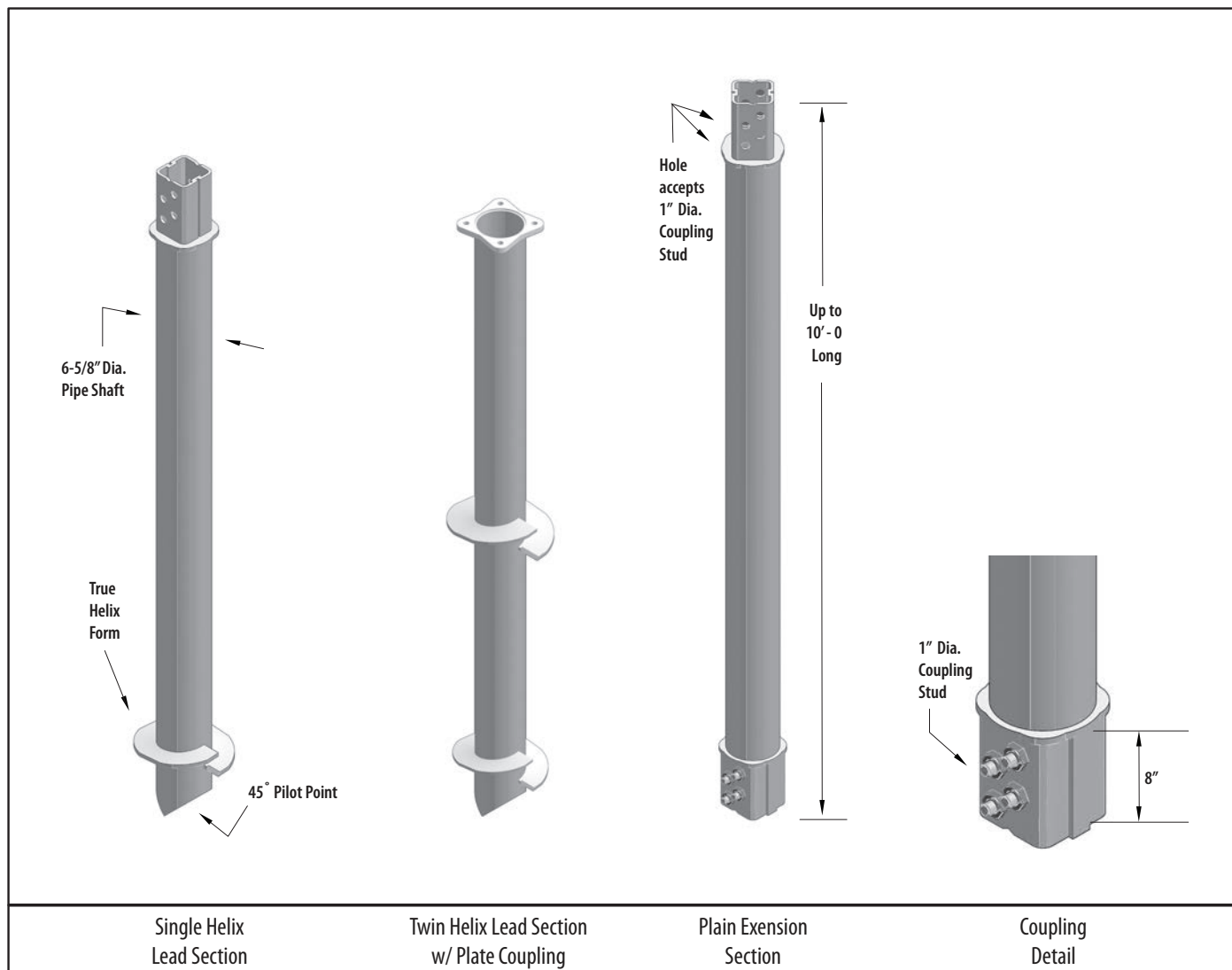
200 kip Ultimate – 100 kip Allowable Capacity

Installation Torque Rating – 40,000 ft-lb

Multi-Purpose 6-5/8" Diameter, 0.280" Wall, Round HSS Shaft with welded square formed couplings

Description:

Hubbell Power Systems, Inc., CHANCE Type RS6625.280 Helical Piles have 200 kip ultimate capacity and 100 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS6625.280 Helical Pile Specifications & Available Configurations

Shaft – HSS 6-5/8 inch OD x 0.280 inch (schedule 40) wall steel shaft produced exclusively for CHANCE products.

Coupling – formed and welded as a deep square socket, connected with multiple threaded studs & nuts.

Helix – 1/2 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 80 ksi.

3 inch Helix Pitch – a Standard established by Hubbell Power Systems, Inc. for CHANCE Helical Piles and Anchors.

Available Helix Diameters: 12, 14, and 16 inches.

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The Standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

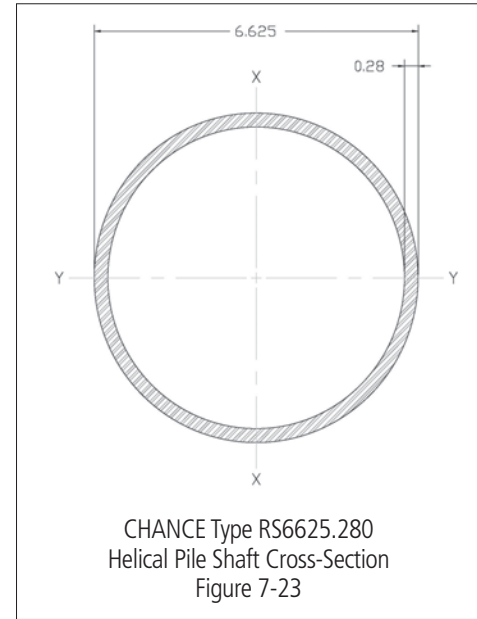
Single, double, triple, Lead Sections, 7, 10, and 15 feet long

Plain Extensions, 5, 7, and 10 feet long

Extensions with Helix Plates, 5, 7 and 10 feet long

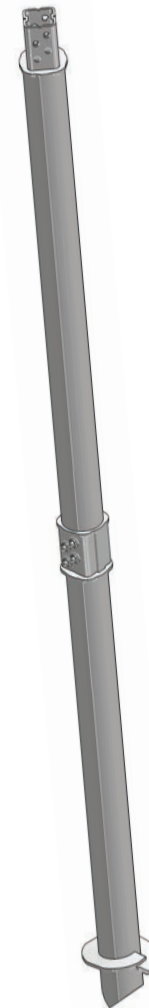
Helical products are Hot Dip Galvanized per ASTM A123 Grade 75.

NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



RS6625.280 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 6 inch Nominal Schedule 40 (0.280 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	6.625 in	168 mm	Corroded	
			6.612 in	167.95 mm
Shaft Size, ID*	6.10 in	155.1 mm	Corroded	
			6.118 in	155.4 mm
Moment of Inertia (I)*	26.37 in ⁴	1096.1 cm ⁴	Corroded	
			25.05 in ⁴	1041.2 cm ⁴
Shaft Area (A)*	5.2 in ²	33.55 cm ²	Corroded	
			4.94 in ²	31.9 cm ²
Section Modulus (S _{x-x})*	7.96 in ³	130.2 cm ³	Corroded	
			7.58 in ³	124 cm ³
Perimeter	20.8 in	52.8 cm	Corroded	
			20.77 in	52.7 cm
Coupling	Formed and Welded Square Socket			
Coupling Bolts	Four 1 in Dia. Grade 2 Studs			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A123 Grade 75, 3.0 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	5 ft ⁻¹		13 m ⁻¹	
Torque Rating	40,000 ft-lb		54,233 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	200 kip	890 kN	150 kip	667 kN
Allowable Tension Strength	100 kip		445 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	200 kip	890 kN	100 kip	445 Kn

* computed with 93% of wall thickness per AISC 360-10, B4.2



Assembly of RS6625.280
Figure 7-24

CHANCE® Type RS8625.250 Helical Piles

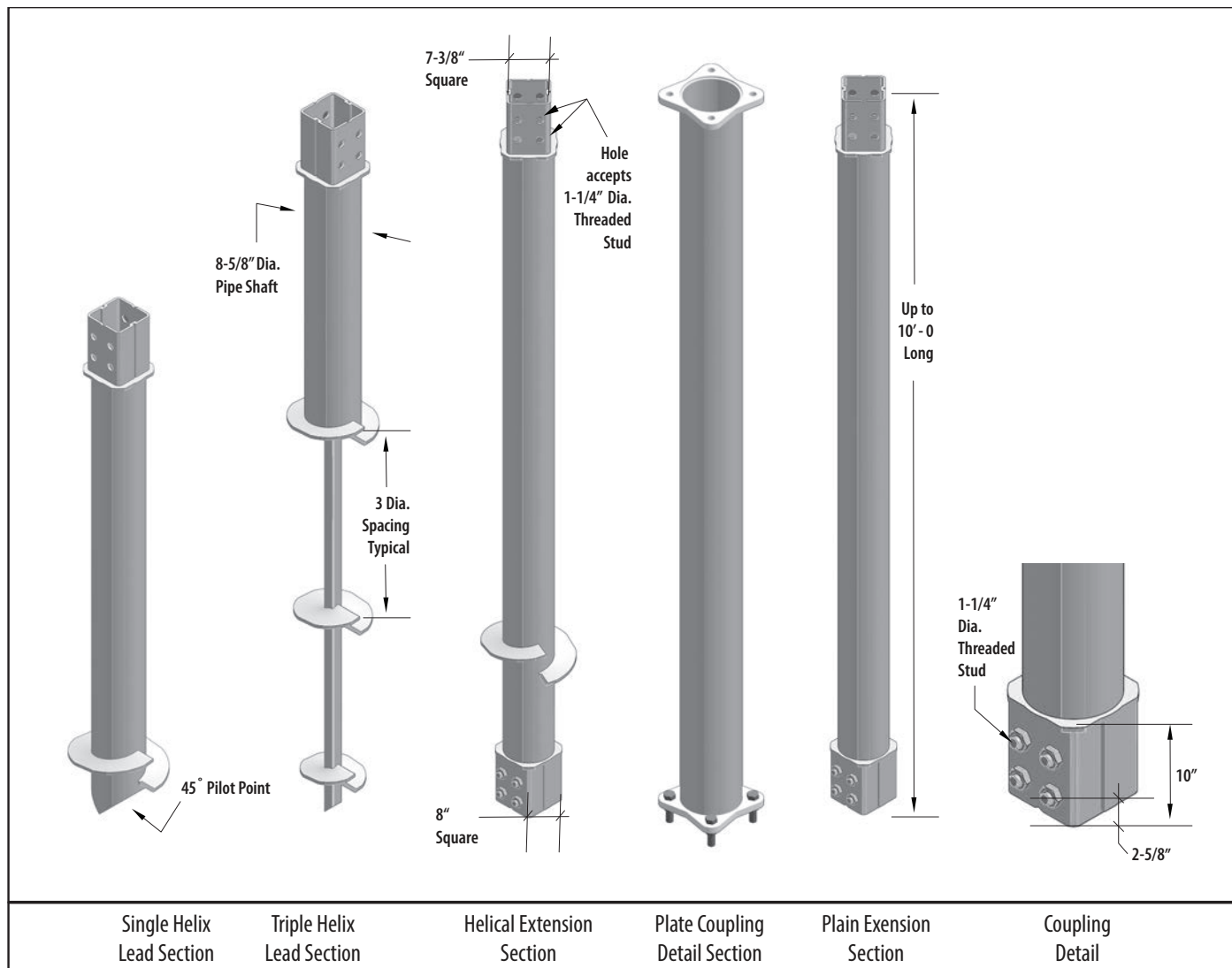
300 kip Ultimate – 150 kip Allowable Capacity

Installation Torque Rating – 60,000 ft-lb

Multi-Purpose 8-5/8" Diameter, 0.250" Wall, Round HSS Shaft with welded square formed couplings

Description:

Hubbell Power Systems, Inc. , CHANCE Type RS8625.280 Helical Piles have 300 kip ultimate capacity and 150 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with "sea-shell" cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

RS8625.250 Helical Pile Specifications & Available Configurations

Shaft – HSS 8-5/8 inch OD x 0.250 inch (schedule 20) wall steel shaft produced exclusively for CHANCE products.

Coupling – formed and welded as a deep square socket, connected with multiple threaded studs and nuts.

Helix – ½, 5/8, and 3/4 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 50 and 80 ksi, depending on helix diameter.

6 inch Helix Pitch – a standard established by Hubbell Power Systems, Inc. for larger diameter CHANCE Helical Anchors and Piles.

Available Helix Diameters: 16, 18, and 24 inches

All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified.

The Standard helix plate has straight sharpened leading edges or can be ordered with a “sea shell” cut. The “sea shell” cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

Configurations:

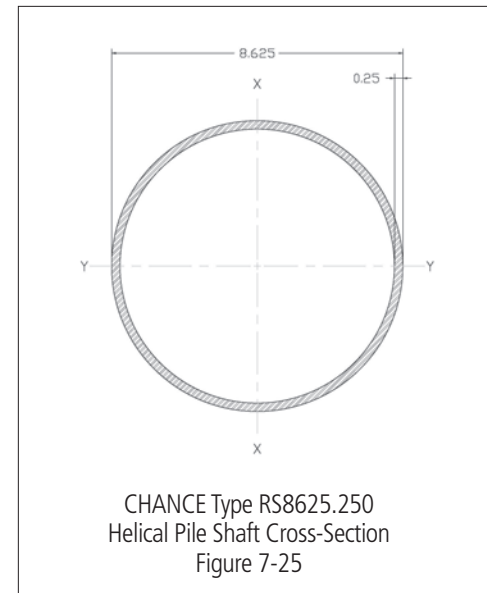
Single, double, triple, Lead Sections, 5, 7, 10, 15, and 20 feet long

Plain Extensions, 5, 7, 10, 15, and 10 feet long

Extensions with Helix Plates, 10 feet long

Helical products are Hot Dip Galvanized per ASTM A123 Grade 75.

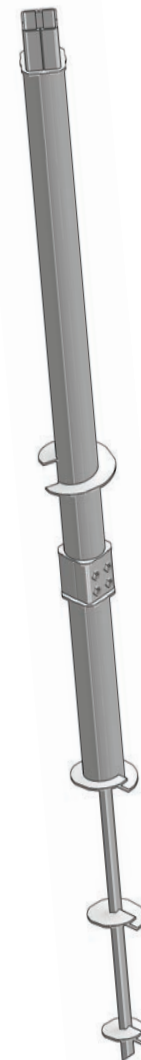
NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.



DRAWINGS & RATINGS

RS8625.250 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS				
SHAFT	Hot Rolled HSS 8 inch Nominal Schedule 20 (0.250 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	8.625 in	219 mm	Corroded	
			8.612 in	218.7 mm
Shaft Size, ID*	8.16 in	207.3 mm	Corroded	
			8.172 in	207.5 mm
Moment of Inertia (I)*	54.12 in ⁴	2249.5 cm ⁴	Corroded	
			51.09 in ⁴	2123.6 cm ⁴
Shaft Area (A)*	6.14 in ²	39.6 cm ²	Corroded	
			5.80 in ²	37.4 cm ²
Section Modulus (S _{x-x})*	12.55 in ³	205.2 cm ³	Corroded	
			11.87 in ³	194.1 cm ³
Perimeter	27.1 in	68.8 cm	Corroded	
			27.05 in	68.1 cm
Coupling	Formed and Welded Square Socket			
Coupling Bolts	Four 1-1/4 in Dia. Grade 2 Studs			
Helix Plates	0.5 - 0.75 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A123 Grade 75, 3.0 mil minimum thickness or Bare Steel			
TORQUE PROPERTIES				
Torque Correlation Factor	5 ft ⁻¹		13 m ⁻¹	
Torque Rating	60,000 ft-lb		81,349 N-m	
STRUCTURAL CAPACITY				
Tension Strength	Nominal		LRFD Design	
	300 kip	1334 kN	225 kip	1001 kN
Allowable Tension Strength	150 kip		667 kN	
TORQUE CORRELATED CAPACITY				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	300 kip	1334 kN	150 kip	667 kN

* computed with 93% of wall thickness per AISC 360-10, B4.2



Assembly of RS8625.250
Figure 7-26

TYPE SS/RS COMBINATION HELICAL PILES

CHANCE® Helical Transition Coupler

Adapts Type SS to Type RS Pile Shafts

The Type SS/RS Combination Pile is used mainly in compression applications in areas where soft/loose soils are located above the bearing strata (hard/dense soils) for the helices. The Type RS material with its much greater section modulus will resist columnar buckling in the soft/loose soil. Its larger shaft diameter also provides for lateral load resistance. Due to its slender size, the Type SS material provides the means for the helix plates to penetrate deeper into hard/dense soil stratum than if the helical pile shaft was pipe shaft only. For a given helix configuration and same available installation energy (i.e. machine), a small displacement shaft will penetrate farther into a soil bearing strata than a large displacement shaft and will disturb less soil.

It is recommended that a CHANCE SS/RS Combination Helical Pile be used in all projects where pipe shaft is being used. The square shaft lead section will provide better load capacity and less settlement than a comparable straight pipe shaft pile.

The transition section (see Figure 7-27) adapts Type SS helical lead sections to Type RS plain extensions. Installation of this combination pile is the same as a standard helical pile. Table 7-9 provides the various standard transition couplers that are available along with their ratings. Special transition couplers, such as RS2875 to RS4500, are also available. Please contact your area CHANCE® Distributor for availability and delivery times.

Table 7-5: Transition Couplers

CATALOG NUMBER	DESCRIPTION	TORQUE RATINGS
C1500896	SS5/SS150 square shaft to a RS2875.203 round shaft	5,500 ft-lb
C1500896	SS5/SS150 square shaft to a RS2875.276 round shaft	7,000 ft-lb
C1500895	SS175 square shaft to a RS3500.300 dia round shaft	10,500 ft-lb
C1500937	SS200 square shaft to a RS3500.300 dia round shaft	13,000 ft-lb

CHANCE HELICAL PULLDOWN® Micropiles

The CHANCE HELICAL PULLDOWN® Micropile (HPM) is a patented (U.S. patent 5,707,180) method used to form a grout column around the shaft of a standard square shaft or pipe shaft helical pile/anchor. The installation process can employ grout only (see Figure 7-28) or grout in combination with either steel or PVC casing (see Figure 7-29). The result is a helical pile with grouted shaft similar, in terms of installation, to drilled and grouted anchors or auger cast-in-place piles using gravity grouting.

The initial reason for developing the HPM was to design a helical pile with sufficient shaft size to resist buckling. However, since its inception, the method has demonstrated more advantages than simply buckling resistance. The advantages and limitations, based on the results of field tests, are summarized herein:

1. Increase buckling capacity of a helical pile shaft in soft/loose overburden soils to the point that end-bearing controls failure.
2. Increased compression capacity due to the mobilization of skin friction at the grout/soil interface. Total capacity is a function of both skin friction and end-bearing.

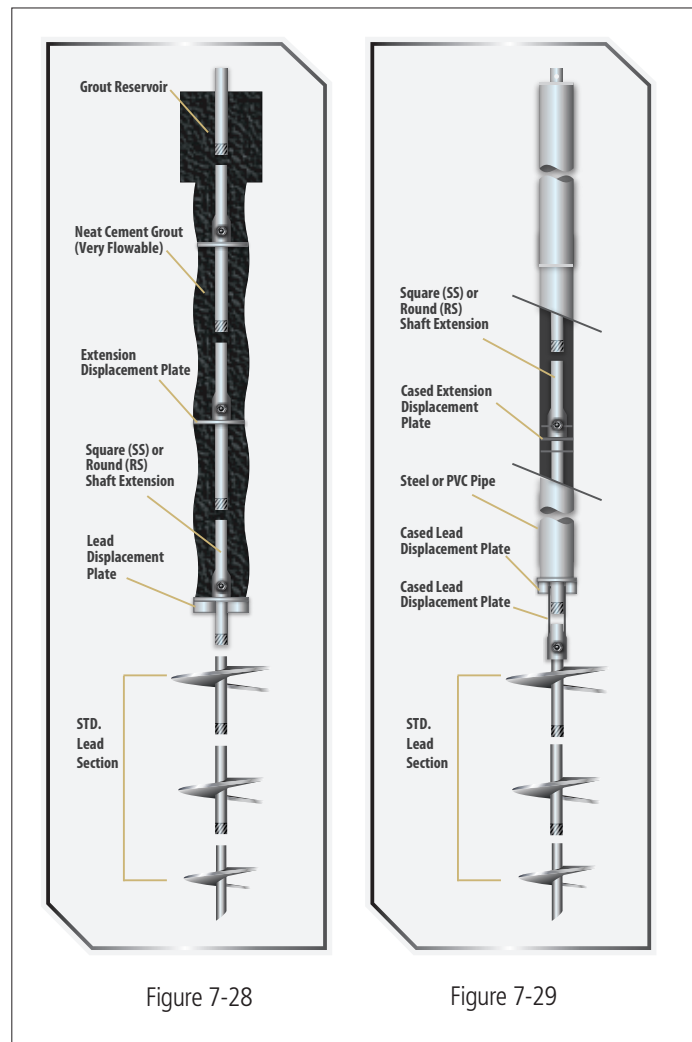


Pile Assembly with Transition Coupler
Figure 7-27

3. Provides additional corrosion protection to anchor shaft in aggressive soils. The grout column provides additional corrosion protection to the steel pile shaft from naturally occurring aggressive soils with high metal loss rates, organic soils such as peat or other corrosive environments like slag, ash, swamp, chemical waste, or other man-made material.
4. Stiffens the load/deflection response of helical piles. Axial deflection per unit load is typically less than with un-grouted shafts.

The installation procedure for CHANCE HELICAL PULLDOWN® Micropiles is rather unique in that the soil along the sides of the shaft is displaced laterally and then replaced and continuously supported by the flowable grout as the pile is installed. To begin the installation process, a helical pile/anchor is placed into the soil by applying torque to the shaft. The helical shape of the bearing plates creates a significant downward force that keeps the pile advancing into the soil. After the Lead Section with the helical plates penetrates the soil, a Lead Displacement Plate and Extension are placed onto the shaft. Resuming torque on the assembly advances the helical plates and pulls the displacement plate downward, forcing soil outward to create a cylindrical void around the shaft. From a reservoir at the surface, a flowable grout is gravity fed and immediately fills the void surrounding the shaft. Additional extensions and displacement plates are added until the helical bearing plates reach the minimum depth required or competent load-bearing soil. This displacement pile system does not require removing spoils from the site.

DRAWINGS & RATINGS



THEORETICAL GROUT VOLUME PER FOOT (METER)

Grout Column Diameter inches (mm)	Pile Shaft Size inches (mm)	Grout Volume ft ³ /ft (m ³ /m)
4 (102)	1-1/2 (38) solid square	0.071 (0.007)
5 (127)	1-1/2 (38) solid square	0.120 (0.011)
	1-3/4 (44) solid square	0.115 (0.011)
6 (152)	1-1/2 (38) solid square	0.181 (0.017)
	1-3/4 (44) solid square	0.175 (0.016)
	2 (51) solid square	0.169 (0.016)
	2-1/4 (57) solid square	0.161 (0.015)
	2-7/8 x 0.203 (73 x 5.2) pipe shaft	0.185 (0.017)
	2-7/8 x 0.276 (73 x 7) pipe shaft	0.181 (0.017)
	3-1/2 x 0.300 (89 x 7.6) pipe shaft	0.176 (0.016)
	4-1/2 x 0.337 (114 x 8.6) pipe shaft	0.166 (0.015)
7 (178)	1-1/2 (38) solid square	0.249 (0.023)
	1-3/4 (44) solid square	0.246 (0.023)
	2 (51) solid square	0.240 (0.022)
	2-1/4 (57) solid square	0.232 (0.022)
	3-1/2 x 0.300 (89 x 7.6) pipe shaft	0.246 (0.023)
	4-1/2 x 0.337 (114 x 8.6) pipe shaft	0.237 (0.022)
8 (203)	1-3/4 (44) solid square	0.328 (0.030)
	2-7/8 x 0.203 (73 x 5.2) pipe shaft	0.337 (0.031)
	2-7/8 x 0.276 (73 x 7) pipe shaft	0.333 (0.031)
	3-1/2 x 0.300 (89 x 7.6) pipe shaft	0.328 (0.030)
	4-1/2 x 0.337 (114 x 8.6) pipe shaft	0.319 (0.029)
8.5 (216)	2 (51) solid square	0.367 (0.034)
	2-1/4 (57) solid square	0.359 (0.033)
10 (254)	1-3/4 (44) solid square	0.524 (0.049)
	2 (51) solid square	0.517 (0.048)
	2-1/4 (57) solid square	0.511 (0.047)
	3-1/2 x 0.300 (89 x 7.6) pipe shaft	0.525 (0.049)
	4-1/2 x 0.337 (114 x 8.6) pipe shaft	0.515 (0.048)

Multiply volume in chart by grout column length to get total volume.

Grout volume per length of shaft extension can easily be calculated by multiplying the shaft length by the volume in the chart. Be sure to convert your units to feet or meters.

Note that if the piles are un-cased, more grout may be required due to irregularities in the column, and subsurface voids. Also, don't forget to add for the grout bath and waste when bidding the job.

Higher Compression Strengths with Grouted Shafts

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of helical piles with various diameter grouted shafts. The strengths listed are based on an unsupported shaft length of 10 feet (3 meters) with either a fixed or pinned end condition at the pile head. The grout column diameters listed are the most common used per each helical product family. Each table includes the compression strengths of shafts without grout for comparison.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into soft ground can be considered fixed and laterally supported at 10 feet below the ground surface.

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type SS5 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	13.6 (60)	12.2 (54)	8.1 (36)	26.6 (118)	24.0 (107)	16.0 (71)
4" OD	30.2 (134)	22.6 (101)	15.1 (67)	59.2 (263)	44.4 (198)	29.6 (132)
5" OD	54.9 (244)	41.2 (183)	27.4 (122)	104.5 (465)	78.3 (348)	52.2 (232)
6" OD	86.2 (383)	64.6 (287)	43.1 (192)	148.3 (660)	111.2 (495)	74.1 (330)
7" OD	126.2 (561)	94.6 (421)	63.1 (281)	194.6 (866)	145.9 (649)	97.3 (433)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type SS150 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	13.6 (60)	12.2 (54)	8.1 (36)	26.6 (118)	24.0 (107)	16.0 (71)
4" OD	30.2 (134)	22.6 (101)	15.1 (67)	59.2 (263)	44.4 (198)	29.6 (132)
5" OD	54.9 (244)	41.2 (183)	27.4 (122)	104.5 (465)	78.3 (348)	52.2 (232)
6" OD	86.2 (383)	64.6 (287)	43.1 (192)	148.3 (660)	111.2 (495)	74.1 (330)
7" OD	126.8 (564)	95.1 (423)	63.4 (282)	208.4 (927)	156.3 (695)	104.2 (464)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type SS175 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	25.8 (115)	23.2 (103)	15.4 (69)	50.5 (225)	45.4 (202)	30.2 (134)
5" OD	66.6 (296)	49.9 (222)	33.3 (148)	127.2 (566)	95.4 (424)	63.6 (283)
6" OD	111.5 (496)	83.6 (372)	55.7 (248)	185.6 (826)	139.2 (619)	92.8 (413)
7" OD	158.3 (704)	118.7 (528)	79.1 (352)	236.2 (1051)	177.2 (788)	118.1 (525)
8" OD	209.2 (931)	156.9 (698)	104.6 (465)	290.4 (1292)	217.8 (969)	145.2 (646)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type SS200 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	43.7 (194)	39.3 (175)	26.2 (117)	85.6 (381)	77.1 (343)	51.3 (228)
6" OD	128.7 (572)	96.6 (430)	64.4 (286)	233.9 (1040)	175.4 (780)	116.9 (520)
7" OD	201.9 (898)	151.4 (673)	101.0 (449)	312.9 (1392)	234.6 (1044)	156.4 (696)
8.5" OD	294.7 (1311)	221.0 (983)	147.4 (656)	407.6 (1813)	305.7 (1360)	203.8 (907)
10" OD	401.4 (1786)	301.1 (1339)	200.7 (893)	513.6 (2285)	385.2 (1713)	256.8 (1142)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type SS225 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	70.9 (315)	63.8 (284)	42.5 (189)	139.0 (618)	125.1 (556)	83.2 (370)
6" OD	154.9 (689)	116.2 (517)	77.5 (345)	281.8 (1254)	211.4 (940)	140.9 (627)
7" OD	228.8 (1018)	171.6 (763)	114.4 (509)	363.2 (1171)	272.4 (1212)	181.6 (808)
8.5" OD	354.3 (1576)	265.7 (1182)	177.1 (788)	482.3 (2145)	361.7 (1609)	241.1 (1072)
10" OD	466.1 (2073)	349.6 (1555)	233.1 (1037)	591.3 (2630)	443.5 (1973)	295.7 (1315)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type RS2875.203 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	42.0 (187)	37.8 (168)	25.1 (112)	55.5 (247)	49.9 (222)	33.2 (148)
6" OD	95.7 (426)	71.8 (319)	47.8 (213)	125.7 (559)	94.3 (419)	62.8 (279)
8" OD	160.1 (712)	120.1 (534)	80.1 (356)	203.2 (904)	152.4 (678)	101.6 (452)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type RS2875.276 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	55.2 (246)	49.7 (221)	33.0 (147)	73.9 (329)	66.5 (296)	44.3 (197)
6" OD	114.3 (508)	85.7 (381)	57.1 (254)	147.7 (657)	110.8 (493)	73.9 (329)
8" OD	181.4 (807)	136.0 (605)	90.7 (403)	226.9 (1009)	170.2 (757)	113.5 (505)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type RS3500.300 Grouted Shaft Piles in Soft Soil^{1,2,3}

Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	90.7 (403)	81.6 (363)	54.3 (242)	110.0 (49)	99.0 (440)	65.9 (293)
6" OD	145.1 (645)	108.8 (484)	72.5 (322)	175.6 (781)	131.7 (586)	87.8 (391)
7" OD	179.3 (798)	134.4 (598)	89.6 (399)	214.1 (952)	160.6 (714)	107.0 (476)
8" OD	216.7 (964)	162.5 (723)	108.4 (482)	257.3 (1145)	193.0 (859)	128.6 (572)
10" OD	314.4 (1399)	235.8 (1049)	157.2 (699)	365.6 (1626)	274.2 (1220)	182.8 (813)

Nominal, LRFD Design, and ASD Allowable Compression Strengths of CHANCE® Type RS4500.337 Grouted Shaft Piles in Soft Soil^{1,2,3}

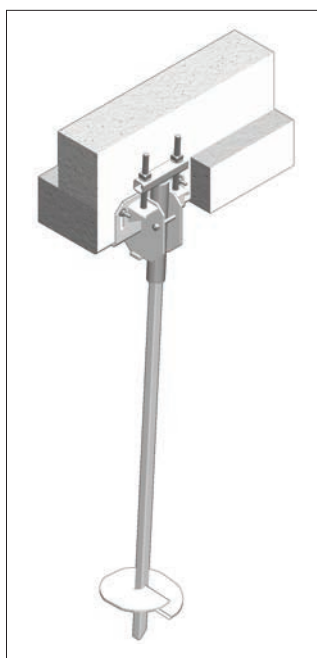
Grout Column Diameter	Nominal, LRFD Design, and ASD Allowable Compression Strengths kip (kN)					
	Soft Soil					
	Pinned			Fixed		
	Nominal	Design	Allowable	Nominal	Design	Allowable
No Grout	156.3 (695)	140.7 (626)	93.6 (416)	175.3 (780)	157.8 (702)	105.0 (467)
6" OD	195.3 (869)	146.5 (652)	97.6 (434)	220.6 (981)	165.5 (736)	110.3 (491)
7" OD	230.4 (1025)	172.8 (769)	115.2 (512)	259.6 (1155)	194.7 (866)	129.8 (577)
8" OD	274.2 (1220)	205.6 (915)	137.1 (610)	306.4 (1363)	229.8 (1022)	153.2 (681)
10" OD	372.8 (1658)	279.6 (1244)	186.4 (829)	415.0 (1846)	311.3 (1385)	207.5 (923)

For SI: 1 kip = 4.448 kN.

¹ Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil.

² Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

³ Column length to "fixity" of shaft in soil = 10 feet (3 meters)



REMEDIAL REPAIR BRACKETS for CHANCE® HELICAL PILES

CHANCE® Helical C1500121 Standard Bracket and T-pipe System

- Used with CHANCE Type SS5 & SS150 1-1/2" Square Shaft Helical Piles and Type RS2875.203 and RS2875.276 2-7/8" OD Pipe Shaft Helical Piles
- Use for lifts up to 4" (10 cm)
- All C1500121 Standard Systems include:
 - Foundation bracket
 - T-pipe
 - Hardware

Order separately: Two 5/8" (16 mm) diameter concrete anchor bolts per pile as required.

Standard finish is Hot-Dip Galvanized per ASTM A153.

Ultimate mechanical strength of bracket body is 80,000 lbs (356 kN). Working mechanical strength of bracket body is 40,000 lbs (178kN).

See table below for system (bracket/pile shaft) ratings.

CHANCE® Helical C1500121 Standard Bracket and T-Pipe Ratings

T-Pipe Designations for the C150-0121 Bracket	Ultimate Mechanical Strength ^{1,3} lbs (kN)	Pile Size in (mm)	Product Series	Max Working Capacity ^{2,3} based on Product Series lbs (kN)	Features
C150-0486	40,000 (178)	1-1/2 (38) Square	SS5 SS150	20,000 (89) 20,000 (89)	Lowest cost with square shaft.
C150-0487	80,000 (356)	1-1/2 (38) Square	SS5 SS150	20,000 (89) 25,000 (111)	Higher capacity with SS150.
C278-0001	40,000 (178)	2-7/8 (73) Round	RS2875.203	20,000 (89)	Lowest cost with round shaft.
C278-0002	80,000 (356)	2-7/8 (73) Round	RS2875.203	25,000 (111)	Higher capacity with stronger T-pipe
C278-8012	40,000 (178)	2-7/8 (73) Round	RS2875.276	20,000 (133)	Higher capacity with RS2875.203
C278-8011	80,000 (356)	2-7/8 (73) Round	RS2875.276	30,000 (133)	Higher capacity with RS2875.276

Notes:

1. Ultimate mechanical strength is for the bracket body and T-pipe combination.
2. The capacity of CHANCE® Helical Pile Systems is a function of many individual elements, including the capacity of the foundation, bracket, pile shaft, helix plate and bearing stratum, as well as the strength of the foundation-to-bracket connection, and the quality of the helical pile installation. The fifth column shows typical working capacities of the CHANCE® Helical Pile System based upon maximum shaft exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count "N₆₀" of 4. Actual capacities could be higher or lower depending on the above factors.
3. The ultimate capacity of the system, i.e., bracket, T-pipe, and pile shaft, can be increased to the pile shaft compression capacity limit as shown on the product data pages provided the pile shaft is reinforced using a pipe sleeve or grout column. The maximum working capacity shall not be greater than one half the ultimate mechanical strength of the bracket and t-pipe combination given above.

Building Code Compliance per ICC-ES ESR-2794

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of C150-0121 Foundation Repair Brackets, T-pipes, and both Type SS5 and SS150 helical piles as evaluated per ICC-ES Acceptance Criteria AC358. These strengths are published in ICC-ES ESR-2794. The strengths listed are based on three different concrete foundation strengths, two different soils conditions - firm and soft. The pile head is assumed to be fixed within the bracket assembly, and the piles are assumed to be braced.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into firm ground can be considered fixed and laterally supported at 5 feet below the ground surface and in soft material at 10 feet.

Nominal Strengths of C1500121 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	Nominal Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500121	C1500486	SS5/150	36.3 (161)	26.6 (118)	36.3 (161)	26.6 (118)	36.3 (161)	26.6 (118)
C1500121	C1500487	SS5	74.6 (332)	26.6 (118)	82.9 (369)	26.6 (118)	89.8 (399)	26.6 (118)
C1500121	C1500487	SS150	78.7 (350)	26.6 (118)	87.1 (387)	26.6 (118)	99.5 (443)	26.6 (118)

LRFD Design Strengths of C150-0121 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	LRFD Design Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500121	C1500486	SS5/150	32.6 (145)	24.0 (107)	32.6 (145)	24.0 (107)	32.6 (145)	24.0 (107)
C1500121	C1500487	SS5	52.2 (232)	24.0 (107)	58.0 (258)	24.0 (107)	62.8 (279)	24.0 (107)
C1500121	C1500487	SS150	55.1 (245)	24.0 (107)	60.9 (271)	24.0 (107)	69.6 (310)	24.0 (107)

ASD Allowable Strengths of C150-0121 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	ASD Allowable Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500121	C1500486	SS5/150	21.7 (97)	16.0 (71)	21.7 (97)	16.0 (71)	21.7 (97)	16.0 (71)
C1500121	C1500487	SS5	32.8 (146)	16.0 (71)	36.4 (162)	16.0 (71)	39.4 (175)	16.0 (71)
C1500121	C1500487	SS150	34.6 (154)	16.0 (71)	38.2 (170)	16.0 (71)	43.7 (194)	16.0 (71)

For SI: 1 kip = 4.448 Kn.

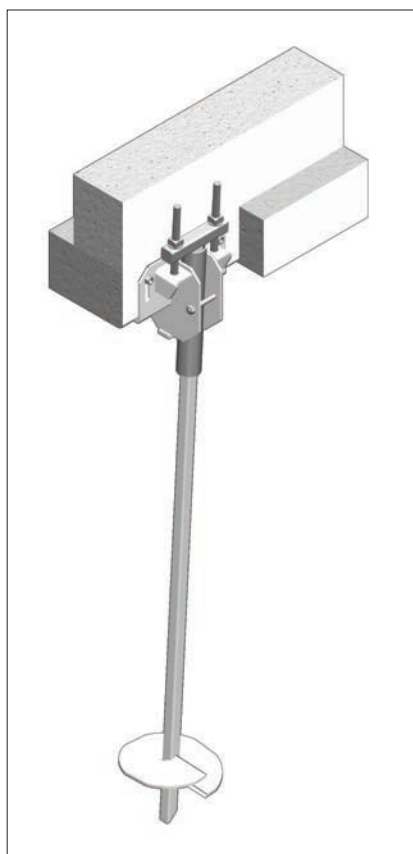
¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with Section 1810.2.2 of the 2012 & 2009 IBC (Section 1808.2.5 of the 2006 IBC).

³Strength ratings apply to the specific bracket, T-pipe and pile/anchor models listed.

⁴See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

⁵Refer to the specified compressive strength of concrete at 28 days.



CHANCE® Helical C1500299 Standard Bracket and T-Pipe System

- Used with CHANCE Type SS175 1-3/4" Square Shaft Helical Piles
- Use for lifts up to 4" (10 cm)
- All C1500299 Standard Systems include:
 - Foundation bracket
 - T-pipe
 - Hardware

Order separately: Two 5/8" (16 mm) diameter concrete anchor bolts per pile as required.

Standard finish is Hot-Dip Galvanized per ASTM A153.

Ultimate mechanical strength of bracket body is 80,000 lbs (356 kN).
Working mechanical strength of bracket body is 40,000 lbs (178kN).

See table below for system (bracket/pile shaft) ratings.

CHANCE® Helical C1500299 Standard Bracket and T-Pipe Ratings

T-Pipe Designations for the C150-0299 Bracket	Ultimate Mechanical Strength ^{1,3} lbs (kN)	Pile Size in (mm)	Product Series	Max Working Capacity ^{2,3} based on Product Series lbs (kN)	Features
C150-0488	80,000 (356)	1-3/4 (44) Square	SS175	30,000 (133)	Lowest cost with Type SS175 Product Series.

Notes:

1. Ultimate mechanical strength is for the bracket body and T-pipe combination.
2. The capacity of CHANCE® Helical Pile Systems is a function of many individual elements, including the capacity of the foundation, bracket, pile shaft, helix plate and bearing stratum, as well as the strength of the foundation-to-bracket connection, and the quality of the helical pile installation. The fifth column shows typical working capacities of the CHANCE® Helical Pile System based upon maximum shaft exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count " N₆₀" of 4. Actual capacities could be higher or lower depending on the above factors.
3. The ultimate capacity of the system, i.e., bracket, T-pipe, and pile shaft, can be increased to the pile shaft compression capacity limit as shown on the product data pages provided the pile shaft is reinforced using a pipe sleeve or grout column. The maximum working capacity shall not be greater than one half the ultimate mechanical strength of the bracket and t-pipe combination given above.

Building Code Compliance per ICC-ES ESR-2794

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of C1500299 Foundation Repair Brackets, T-pipes, and Type SS175 Helical Piles as evaluated per ICC-ES Acceptance Criteria AC358. These strengths are published in ICC-ES ESR-2794. The strengths listed are based on three different concrete foundation strengths, two different soils conditions - firm and soft. The pile head is assumed to be fixed within the bracket assembly, and the piles are assumed to be braced.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into firm ground can be considered fixed and laterally supported at 5 feet below the ground surface and in soft material at 10 feet.

Nominal Strengths of C1500299 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	Nominal Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500299	C1500488	SS175	83.8 (373)	50.5 (225)	91.4 (407)	50.5 (225)	99.0 (440)	50.5 (225)

LRFD Design Strengths of C1500299 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	LRFD Design Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500299	C1500488	SS175	58.6 (261)	42.9 (191)	66.5 (296)	45.4 (202)	74.2 (330)	45.4 (202)

ASD Allowable Strengths of C1500299 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	ASD Allowable Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500299	C1500488	SS175	36.8 (164)	27.7 (123)	41.7 (185)	30.2 (134)	49.5 (220)	30.2 (134)

For SI: 1 kip = 4.448 Kn.

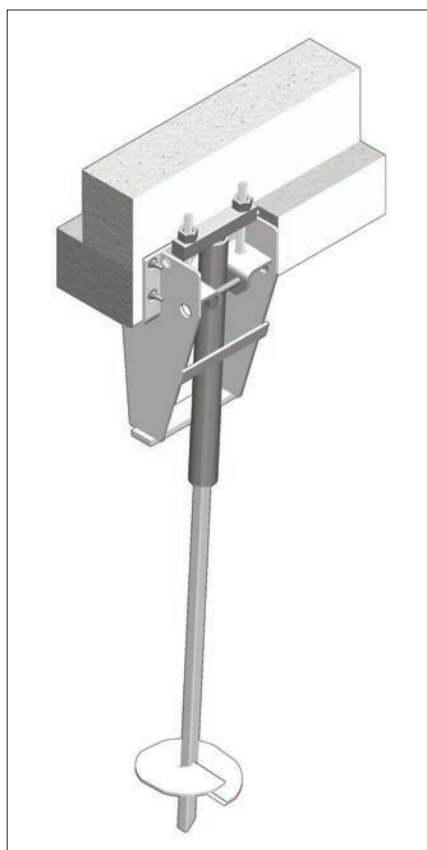
¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with Section 1810.2.2 of the 2012 & 2009 IBC (Section 1808.2.5 of the 2006 IBC).

³Strength ratings apply to the specific bracket, T-pipe and pile/anchor models listed.

⁴See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

⁵Refer to the specified compressive strength of concrete at 28 days.



CHANCE® Helical C1500147 Heavy Duty Bracket and T-Pipe System

- Used with CHANCE Type SS175 1-3/4" Square Shaft Helical Piles, Type SS200 2" Square Shaft Helical Piles, and Type RS3500.300 3-1/2" OD Round Shaft Helical Piles
- Use for lifts up to 4" (10 cm)
- All C150-0147 Standard Systems include:
 - Foundation bracket
 - T-pipe
 - Hardware

Order separately: Four 5/8" (16 mm) diameter concrete anchor bolts per pile as required.

Standard finish is HOT-DIP GALVANIZED per ASTM A153.

Ultimate mechanical strength of bracket body is 120,000 lbs (534 kN).
Working mechanical strength of bracket body is 60,000 lbs (267kN).

See table below for system (bracket/pile shaft) ratings.

CHANCE® Helical C1500147 Standard Bracket and T-Pipe Ratings

T-Pipe Designations for the C150-0147 Bracket	Ultimate Mechanical Strength ^{1,3} lbs (kN)	Pile Size in (mm)	Product Series	Max Working Capacity ^{2,3} based on Product Series lbs (kN)	Features
C1500474	120,000 (534)	1-3/4 (44) Square	SS175	40,000 (178)	Lowest cost with square shaft.
C1500475	120,000 (534)	3-1/2 (89) Round	RS3500.300	50,000 (222)	Higher capacity with RS3500.300.
C1500508	120,000 (534)	2 (51) Square	SS200	50,000 (222)	Highest capacity with square shaft.

Notes:

1. Ultimate mechanical strength is for the Bracket Body and T-Pipe combination.
2. The capacity of CHANCE® Helical Pile Systems is a function of many individual elements, including the capacity of the foundation, bracket, pile shaft, helix plate and bearing stratum, as well as the strength of the foundation-to-bracket connection, and the quality of the helical pile installation. The fifth column shows typical working capacities of the CHANCE® Helical Pile System based upon maximum shaft exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count " N₆₀" of 4. Actual capacities could be higher or lower depending on the above factors.
3. The ultimate capacity of the system, i.e., bracket, T-pipe, and pile shaft, can be increased to the pile shaft compression capacity limit as shown on the product data pages provided the pile shaft is reinforced using a pipe sleeve or grout column. The maximum working capacity shall not be greater than one half the ultimate mechanical strength of the bracket and t-pipe combination given above.

Building Code Compliance per ICC-ES ESR-2794

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of C150-0147 Foundation Repair Brackets, T-pipes, and Type SS175 Helical Piles as evaluated per ICC-ES Acceptance Criteria AC358. These strengths are published in ICC-ES ESR-2794. The strengths listed are based on three different concrete foundation strengths, two different soils conditions - firm and soft. The pile head is assumed to be fixed within the bracket assembly, and the piles are assumed to be braced.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into firm ground can be considered fixed and laterally supported at 5 feet below the ground surface and in soft material at 10 feet.

Nominal Strengths of C150-0147 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	Nominal Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500147	C1500474	SS175	100 (445)	50.5 (225)	100 (445)	50.5 (225)	100 (445)	50.5 (225)

LRFD Design Strengths of C150-0147 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	LRFD Design Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500147	C1500474	SS175	86.7 (386)	45.4 (202)	88.4 (393)	45.4 (202)	90 (400)	45.4 (202)

ASD Allowable Strengths of C150-0147 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	ASD Allowable Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500147	C1500474	SS175	54.4 (242)	30.2 (134)	57.0 (254)	30.2 (134)	60.0 (267)	30.2 (134)

For SI: 1 kip = 4.448 Kn.

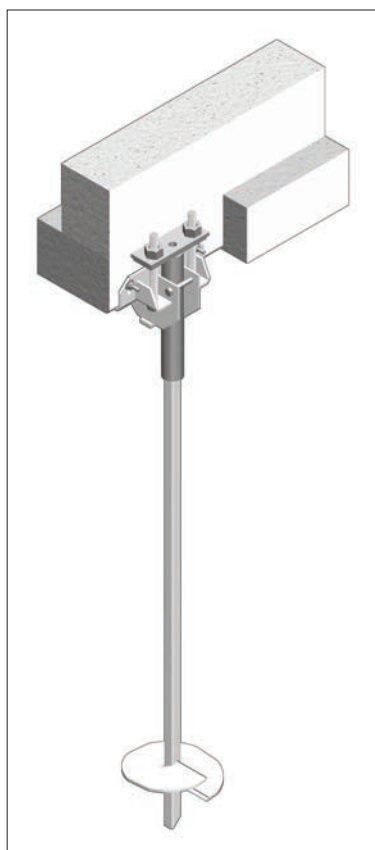
¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with Section 1810.2.2 of the 2012 & 2009 IBC (Section 1808.2.5 of the 2006 IBC).

³Strength ratings apply to the specific bracket, T-pipe and pile/anchor models listed.

⁴See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

⁵Refer to the specified compressive strength of concrete at 28 days.



CHANCE® Helical PSAC1500499 Low Profile Bracket and T-Pipe System

- Used with CHANCE Type SS5 & SS150 1-1/2" Square Shaft Helical Piles and Type RS2875.203 and RS2875.276 2-7/8" OD Pipe Shaft Helical Piles
- Use for lifts up to 4" (10 cm)

All PSAC1501500499 Low Profile Systems include:

- Foundation bracket
- T-pipe
- Hardware

Order separately: Two 1/2" (13 mm) diameter concrete anchor bolts per pile as required.

Standard finish is Hot-Dip Galvanized per ASTM A153.

Ultimate mechanical strength of bracket body is 30,000 lbs (133 kN). Working mechanical strength of bracket body is 15,000 lbs (67 kN).

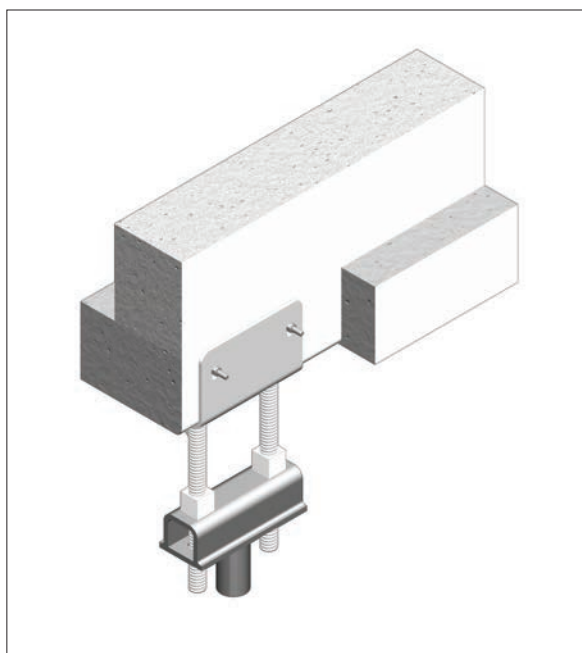
See table below for system (bracket/pile shaft) ratings.

CHANCE® Helical PSAC1500499 Low Profile Bracket and T-Pipe Ratings

T-Pipe Designations for the PSAC1500499 Bracket	Ultimate Mechanical Strength ^{1,3} lbs (kN)	Pile Size in (mm)	Product Series	Max Working Capacity ^{2,3} based on Product Series lbs (kN)	Features
PSAC150-0503	30,000 (133)	1-1/2 (38) Square	SS5 SS150	15,000 (67)	Lowest cost with Type SS5 Product Series
PSAC278-0003	30,000 (133)	2-7/8 (73) Round	RS2875.203	15,000 (67)	Lowest cost with Type RS2875.203 Product Series

Notes:

1. Ultimate mechanical strength is for the bracket body and T-pipe combination.
2. The capacity of CHANCE® Helical Pile Systems is a function of many individual elements, including the capacity of the foundation, bracket, pile shaft, helix plate and bearing stratum, as well as the strength of the foundation-to-bracket connection, and the quality of the helical pile installation. The fifth column shows typical working capacities of the CHANCE® Helical Pile System based upon maximum shaft exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count " N₆₀" of 4. Actual capacities could be higher or lower depending on the above factors.
3. The ultimate capacity of the system, i.e., bracket, T-pipe, and pile shaft, can be increased to the pile shaft compression capacity limit as shown on the product data pages provided the pile shaft is reinforced using a pipe sleeve or grout column. The maximum working capacity shall not be greater than one half the ultimate mechanical strength of the bracket and T-pipe combination given above.



CHANCE® Helical Direct Jack Underpinning Brackets

- Used with CHANCE Type SS5 & SS150 1-1/2" and SS175 1-3/4" Square Shaft Helical Piles, Type RS2875.276 2-7/8" OD Pipe Shaft Helical Piles, and Type RS3500.300 3-1/2" OD Pipe Shaft Helical Piles
- Use for lifts up to 4" (10 cm)
- All Direct Jack Underpinning Brackets include:
 - Foundation bracket
 - T-pipe
 - Two Thread Bar Nuts

Order separately: Two 1/2" (13 mm) diameter concrete anchor bolts per pile as required.

Standard finish is Hot-Dip Galvanized per ASTM A153

The bracket body and T-pipe are packaged together.

See table below for system (bracket/pile shaft) ratings.

CHANCE® Helical Direct Jack Underpinning Brackets					
Direct Jack Catalog Number	Ultimate Mechanical Strength ^{1,3} lbs (kN)	Pile Size in (mm)	Product Series	Max Working Capacity ^{2,3} based on Product Series lbs (kN)	Features
C150-0738	70,000 (356)	1-1/2 (38) Square	SS5 SS150	35,000 (133)	Lowest cost
C150-0733	100,000 (445)	1-3/4 (44) Square	SS175	50,000 (222)	Highest Capacity
C150-0840	72,000 (320)	2-7/8 (73) Round	RS2875.276	36,000 (160)	
C150-0841	91,000 (405)	3-1/2 (89) Round	RS3500.300	45,500 (202)	

Notes:

1. Ultimate mechanical strength is for the bracket body and T-pipe combination.
2. The capacity of CHANCE® Helical Pile Systems is a function of many individual elements, including the capacity of the foundation, bracket, pile shaft, helix plate and bearing stratum, as well as the strength of the foundation-to-bracket connection, and the quality of the helical pile installation. The fifth column shows typical working capacities of the CHANCE® Helical Pile System based upon maximum shaft exposure of 2 feet and soil strength having a minimum Standard Penetration Test (SPT) Blow Count " N₆₀" of 4. Actual capacities could be higher or lower depending on the above factors.
3. The ultimate capacity of the system, i.e., bracket, T-pipe, and pile shaft, can be increased to the pile shaft compression capacity limit as shown on the product data pages provided the pile shaft is reinforced using a pipe sleeve or grout column. The maximum working capacity shall not be greater than one half the ultimate mechanical strength of the bracket and t-pipe combination given above.

Building Code Compliance per ICC-ES ESR-2794

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of C1500738 Foundation Repair Bracket, T-pipe, and Type SS5 Helical Piles as evaluated per ICC-ES Acceptance Criteria AC358. These strengths are published in ICC-ES ESR-2794. The strengths listed are based on three different concrete foundation strengths, two different soils conditions - firm and soft. The pile head is assumed to be fixed within the bracket assembly, and the piles are assumed to be braced.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into firm ground can be considered fixed and laterally supported at 5 feet below the ground surface and in soft material at 10 feet.

Nominal Strengths of C1500738 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	Nominal Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500738	Incl w/ Brkt	SS5	50.9 (226)	23.1 (103)	50.9 (226)	23.1 (103)	50.9 (226)	23.1 (103)

LRFD Design Strengths of C1500738 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	LRFD Design Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500738	Incl w/ Brkt	SS5	45.8 (204)	20.8 (93)	45.8 (204)	20.8 (93)	45.8 (204)	20.8 (93)

ASD Allowable Strengths of C1500738 Remedial Repair Brackets & Helical Piles^{1,2,3,4}

Bracket Catalog Number	T-Pipe Catalog Number	Pile Model	ASD Allowable Strength in Axial Compression kip (kN)					
			2500 psi Concrete ⁵		3000 psi Concrete ⁵		4000 psi Concrete ⁵	
			Firm Soil	Soft Soil	Firm Soil	Soft Soil	Firm Soil	Soft Soil
C1500738	Incl w/ Brkt	SS5	30.5 (136)	13.8 (61)	30.5 (136)	13.8 (61)	30.5 (136)	13.8 (61)

For SI: 1 kip = 4.448 Kn.

¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with Section 1810.2.2 of the 2012 & 2009 IBC (Section 1808.2.5 of the 2006 IBC).

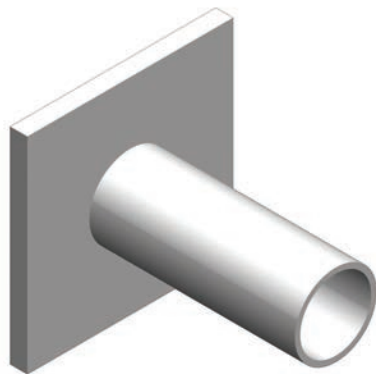
³Strength ratings apply to the specific bracket, T-pipe and pile/anchor models listed.

⁴See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

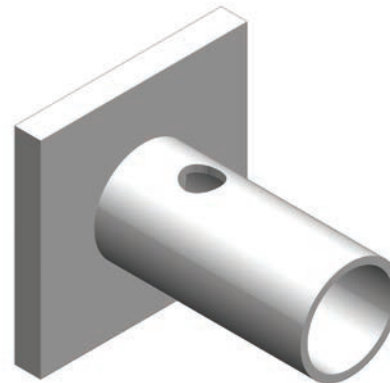
⁵Refer to the specified compressive strength of concrete at 28 days.

NEW CONSTRUCTION PILE CAPS

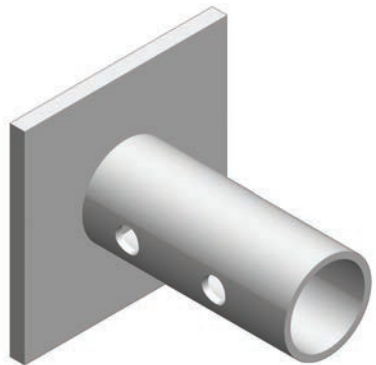
The CHANCE® New Construction Pile Caps are designed for use with the CHANCE® Type SS Square Shaft and RS Round Shaft helical piles and for embedment in cast-in-place concrete foundations. Each new construction pile cap consists of either one bearing plate and one steel tube sleeve that are factory-welded together to form the cap, or one bearing plate, two re-bars and one steel tube sleeve that are factory-welded together. The plate type pile caps are designed to be used in spread footings, grade beams, structural slabs, and reinforced concrete pile caps. The re-bar cap is designed to be used in grade beams and reinforced pile caps. The concrete foundation and interaction of pile shaft, new construction pile cap, and concrete footing for moment transfer, as applicable, must be designed and justified with due consideration to all applicable limit states and the direction and eccentricity of applied loads, including reactions provided by the brackets, acting on the concrete foundation. For preliminary design guidelines for reinforced pile caps refer to Section 4.



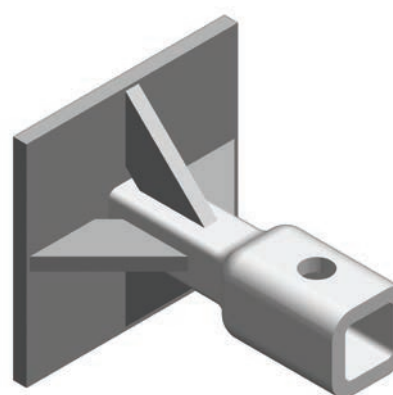
New Construction Cap for Type SS Shafts
Compression Only



New Construction Cap for Type SS Shafts
Compression and Uplift



New Construction Cap for Type RS Shafts
Compression and Uplift



New Construction Cap for Type SS Shafts
Equal Compression and Uplift Capacity

CHANCE® Helical New Construction Pile Caps				
Pile Cap Designation	Design (Working) Load kip (kN)	Plate Size (square)	Pipe OD & Length	Description
C150-0458	40 (178) compression	6" x 6" x 1/2"	2-1/2" x 6"	Fits SS5/SS150 and RS2875.165/RS2875.203; use for compression only.
C150-0459	60 (267) compression	6" x 6" x 3/4"	3" x 6"	Fits SS175; use for compression only.
C150-0465	40 (178) compression 20 (89) uplift	6" x 6" x 1/2"	2-1/2" x 6"	Fits SS5/SS150; use for uplift and compression.
C150-0467	60 (267) compression 30 (133) uplift	6" x 6" x 3/4"	3" x 6"	Fits SS175; use for uplift and compression.
C150-0777	35 (156) compression	7" x 7" x 1/2"	2-1/2" x 6"	Fits SS5/SS150; use for compression only
C150-0778	52.5 (234) compression	8" x 8" x 1/2"	2-7/8" x 6"	Fits SS175; use for compression only
C150-0779	75 (334) compression	12" x 12" x 1/2"	3-1/2" x 6"	Fits SS200; use for compression only
C150-0780	100 (445) compression	12" x 12" x 1/2"	3-1/2" x 6"	Fits SS225; use for compression only
C150-0781	36 (160) compression	7" x 7" x 1/2"	3-1/2" x 6"	Fits RS2875; use for compression only
C150-0782	50 (222) compression	10" x 10" x 1/2"	4-1/2" x 6"	Fits RS3500; use for compression only
C150-0783	70 (311) compression	12" x 12" x 1/2"	5-9/16" x 6"	Fits RS4500; use for compression only
C150-0793	35 (156) compression 23 (102) uplift	7" x 7" x 1/2"	2-1/2" x 6"	Fits SS5/150; use for uplift and compression
C150-0794	52.5 (234) compression 37 (165) uplift	8" x 8" x 1/2"	2-7/8" x 6"	Fits SS175; use for uplift and compression
C150-0795	75 (334) compression 45 (200) uplift	12" x 12" x 1/2"	3-1/2" x 6"	Fits SS200; use for uplift and compression
C150-0796	100 (445) compression 40 (178) uplift	12" x 12" x 1/2"	3-1/2" x 6"	Fits SS225; use for uplift and compression
C150-0797	36 (160) compression 36 (160) uplift	7" x 7" x 1/2"	3-1/2"	Fits RS2875; use for uplift and compression
C150-0798	50 (222) compression 50 (222) uplift	10" x 10" x 1/2"	4-1/2"	Fits RS3500; use for uplift and compression
C150-0799	70 (311) compression 70 (311) uplift	12" x 12" x 1/2"	5-9/16"	Fits RS4500; use for uplift and compression

Building Code Compliance per ICC-ES ESR-2794

The following tables provide the nominal, LRFD design, and ASD allowable compression strengths of C1500458G and C1500465G pile caps used with Type SS5 helical piles; and the C1500459G and C1500467G pile caps used with Type SS175 helical piles as evaluated per ICC-ES Acceptance Criteria AC358. The last table on page 7-64 provides the nominal, LRFD design, and ASD allowable tension strengths of C1500465G pile cap used with Type SS5 helical piles; and C1500467G pile cap used with Type SS175 helical piles as evaluated per ICC-ES Acceptance Criteria AC358. These strengths are published in ICC-ES ESR-2794. The strengths listed are based on three different concrete foundation strengths, two different soils conditions - firm and soft. The pile head is assumed to be either pinned or fixed within the concrete foundation depending on cover and reinforcing; and the piles are assumed to be braced. The helical pile must be embedded at least 7.5 inches into the concrete foundation when designed as fixed end condition.

Per the International Building Code (IBC) 2006 Section 1808.2.9.2 & IBC 2009 Section 1810.2.1, the depth to fixity of piles driven into firm ground can be considered fixed and laterally supported at 5 feet below the ground surface and in soft material at 10 feet.

Nominal Strengths of New Construction Pile Caps Loaded in Compression^{1,2,3,4,5,6}

Catalog Number	Pile Model	Nominal Compression Strength kip (kN)											
		2500 psi Concrete ⁶				3000 psi Concrete ⁶				4000 psi Concrete ⁶			
		Firm Soil		Soft Soil		Firm Soil		Soft Soil		Firm Soil		Soft Soil	
		Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed
C150-0458G	SS5	54.4 (242)	60.0 (267)	13.6 (60)	26.6 (118)	54.4 (242)	62.3 (277)	13.6 (60)	26.6 (118)	54.4 (242)	66.9 (298)	13.6 (60)	26.6 (118)
C150-0459G	SS175	100 (445)	100 (445)	25.8 (115)	50.5 (225)	100 (445)	100 (445)	25.8 (115)	50.5 (225)	100 (445)	100 (445)	25.8 (115)	50.5 (225)
C150-0465G	SS5	54.4 (242)	60.0 (267)	13.6 (60)	26.6 (118)	54.4 (242)	62.3 (277)	13.6 (60)	26.6 (118)	54.4 (242)	66.9 (298)	13.6 (60)	26.6 (118)
C150-0467G	SS175	100 (445)	100 (445)	25.8 (115)	50.5 (225)	100 (445)	100 (445)	25.8 (115)	50.5 (225)	100 (445)	100 (445)	25.8 (115)	50.5 (225)

LRFD Design Strengths of New Construction Pile Caps Loaded in Compression^{1,2,3,4,5,6}

Catalog Number	Pile Model	LRFD Design Compression Strength kip (kN)											
		2500 psi Concrete ⁶				3000 psi Concrete ⁶				4000 psi Concrete ⁶			
		Firm Soil		Soft Soil		Firm Soil		Soft Soil		Firm Soil		Soft Soil	
		Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed
C150-0458G	SS5	48.9 (218)	50.6 (225)	12.2 (54)	24.0 (107)	48.9 (218)	52.0 (231)	12.2 (54)	24.0 (107)	48.9 (218)	54.7 (243)	12.2 (54)	24.0 (107)
C150-0459G	SS175	79.2 (352)	79.2 (352)	23.2 (103)	45.4 (202)	90 (400)	90 (400)	23.2 (103)	45.4 (202)	90 (400)	90 (400)	23.2 (103)	45.4 (202)
C150-0465G	SS5	48.9 (218)	50.6 (225)	12.2 (54)	24.0 (107)	48.9 (218)	52.0 (231)	12.2 (54)	24.0 (107)	48.9 (218)	54.7 (243)	12.2 (54)	24.0 (107)
C150-0467G	SS175	79.2 (352)	79.2 (352)	23.2 (103)	45.4 (202)	90 (400)	90 (400)	23.2 (103)	45.4 (202)	90 (400)	90 (400)	23.2 (103)	45.4 (202)

ASD Allowable Strengths of New Construction Pile Caps Loaded in Compression^{1,2,3,4,5,6}

Catalog Number	Pile Model	ASD Allowable Compression Strength kip (kN)											
		2500 psi Concrete ⁶				3000 psi Concrete ⁶				4000 psi Concrete ⁶			
		Firm Soil		Soft Soil		Firm Soil		Soft Soil		Firm Soil		Soft Soil	
		Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed	Pinned	Fixed
C1500458G	SS5	32.6 (145)	33.7 (150)	8.1 (36)	16.0 (71)	32.6 (145)	34.6 (154)	8.1 (36)	16.0 (71)	32.6 (145)	36.4 (162)	8.1 (36)	16.0 (71)
C1500459G	SS175	52.7 (234)	52.7 (234)	15.4 (69)	30.2 (134)	60.0 (267)	60.0 (267)	15.4 (69)	30.2 (134)	60.0 (267)	60.0 (267)	15.4 (69)	30.2 (134)
C1500465G	SS5	32.6 (145)	33.7 (150)	8.1 (36)	16.0 (71)	32.6 (145)	34.6 (154)	8.1 (36)	16.0 (71)	32.6 (145)	36.4 (162)	8.1 (36)	16.0 (71)
C1500467G	SS175	52.7 (234)	52.7 (234)	15.4 (69)	30.2 (134)	60.0 (267)	60.0 (267)	15.4 (69)	30.2 (134)	60.0 (267)	60.0 (267)	15.4 (69)	30.2 (134)

For SI: 1 inch = 25.4 mm, 1 kip = 4.448 kN, 1lbf-ft = 1.356 N-m.

¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with Section 1810.2.2 of the 2012 & 2009 IBC (Section 1808.2.5 of the 2006 IBC).

³Capacities apply to the specific pile cap and pile models listed.

⁴The fixed end condition requires that the foundation itself be fixed and that pile and pile cap be embedded in the foundation with adequate concrete cover and reinforcing to resist 56.4 kip-in or 116 kip-in nominal bending moment for SS5 and SS175 pile models, respectively. The center of shaft must be at least 6-in away from the end/corner of the concrete footing.

⁵See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

⁶Refer to the specified compressive strength of concrete at 28 days.

Nominal, LRFD Design and ASD Allowable Strengths of New Construction Pile Caps Loaded in Tension^{1,2,3,4}

Catalog Number	Pile Model	Nominal, LRFD Design and ASD Allowable Strengths in Tension kip (kN)								
		2500 psi Concrete ⁵			3000 psi Concrete ⁵			4000 psi Concrete ⁵		
		Nom Str	Design Str	Allow Str	Nom Str	Design Str	Allow Str	Nom Str	Design Str	Allow Str
C1500465G	SS5	56.2 (250)	42.1 (187)	28.1 (125)	56.2 (250)	42.1 (187)	28.1 (125)	56.2 (250)	42.1 (187)	28.1 (125)
C1500467G	SS175	78.9 (351)	59.2 (263)	39.5 (176)	78.9 (351)	59.2 (263)	39.5 (176)	78.9 (351)	59.2 (263)	39.5 (176)

For SI: 1 inch = 25.4 mm, 1 kip = 4.448 kN.

¹Refer to Section 4.1.3 of ICC-ES ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

²Strength ratings are based on a design corrosion level of 50-years.

³Capacities apply to the specific pile cap and pile models listed.

⁴See Section 4.1.2 of ICC-ES ESR-2794 for applicable limit states that must be evaluated by a registered design professional.

⁵Refer to the specified compressive strength of concrete at 28 days.



DRAWINGS & RATINGS

